

PowerNet Management Information Base (MIB)

Version 3.4.4

Reference Guide

REFERENCE GUIDE: POWERNET® MANAGEMENT INFORMATION BASE (MIB), VERSION 3.4.4

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Contents

About This Guide 1

Guide Purpose	1
Guide Structure	1
Related Documents	2
Terms Used in This Guide	2

Chapter 1: PowerNet MIB Structure 3

PowerNet MIB Traps	3
PowerNet MIB OIDs	3
SNMP Access Controls	4
SNMP Browser Structure	4
PowerNet MIB OIDs Structure	4
Tabled OIDs	5

Chapter 2: How to Manage Agents and Management Cards 6

How to Monitor a PowerNet Agent	6
[powerNetSoftwareSystem]	7
[powerNetSoftwareConfig]	7
How to Manage the SNMP Agent at a Hardware Device	7
[mcontrol]	8
[mconfig]	8
[mtrapargs]	9
[mfiletransfer]	9
[mfiletransferStatus]	9
[mfiletransferConfig]	10
[mfiletransferControl]	10

Chapter 3: How to Manage a UPS 11

How to Monitor a UPS	12
[upsIdent] UPS Identification OIDs	12
[upsBasicIdent]	12
[upsAdvIdent]	13
[upsBattery] UPS Battery OIDs	13
[upsBasicBattery]	13
[upsAdvBattery]	14
[upsComm] UPS Communication OID	14
[upsInput] UPS Input OIDs	14
[upsBasicInput]	14
[upsAdvInput]	15
[upsOutput] UPS Output OIDs	16
[upsBasicOutput]	16
[upsAdvOutput]	17

How to Control a UPS	17
[upsControl] OIDs 17	
[upsBasicControl] 17	
[upsAdvControl] 18	
How to Configure a UPS	20
[upsConfig] 20	
[upsBasicConfig] 20	
[upsAdvConfig] 21	
How to Test a UPS	23
[upsTest] 23	
[upsAdvTest] 23	
How to Use OIDs for 3-Phase UPS Models	25
[upsPhaseResetValues] 25	
[upsPhaseInput] 26	
[upsPhaseOutput] 27	

Chapter 4: How to Manage an Environmental Monitor 28

External Environmental Monitor (em) OIDs	28
[emIdent] OID 28	
[emConfig] OIDs 29	
[emConfigProbes] OIDs 29	
[emConfigContacts] OIDs 30	
[emStatus] OIDs 30	
[emStatusCommStatus] OID 30	
[emStatusProbes] OIDs 31	
[emStatusContacts] OIDs 31	
Integrated Environmental Monitor (iem) OIDs (AP9618 or AP9619 Network Management Card Only)	32
[iemIdent] OID 32	
[iemConfig] OIDs 32	
[iemConfigProbes] OIDs 33	
[iemConfigContacts] OIDs 33	
[iemStatus] OIDs 34	
[iemStatusProbes] OIDs 34	
[iemStatusContacts] OIDs 35	
[iemStatusRelays] OIDs 35	
Measure-UPS (mUps) OIDs	35
[mUpsEnviron] Environment OIDs 36	
[mUpsContact] Contact OIDs 36	

Chapter 5: How to Manage a MasterSwitch Unit 37

[sPDUIdent] Identification OIDs	38
[sPDUMasterControl] Master Control OIDs	39
[sPDUMasterConfig] Master Configuration OIDs	40
[sPDUOutletControl] Outlet Control OIDs	41
[sPDUOutletConfig] Outlet Configuration OIDs	42

Chapter 6: How to Manage a MasterSwitch VM Unit 43

[sPDUIdentVM] Identification OIDs	44
[sPDUMasterControlVM] Master Control OIDs	45
[sPDUMasterConfigVM] Master Configuration OIDs	45
[sPDUMasterStatusVM] Master Status OIDs	47
[sPDUOutletControlVM] Outlet Control OIDs	48
[sPDUOutletConfigVM] Outlet Configuration OIDs	49
[sPDUOutletStatusVM] Outlet Status OIDs	50

Chapter 7: How to Manage a MasterSwitch Plus Unit 51

[sPDUIdentMSP] Identification OIDs	52
[sPDUMasterControlMSP] Master Control OIDs	53
[sPDUMasterConfigMSP] Master Configuration OIDs	54
[sPDUMasterStatusMSP] Master Status OIDs	54
[sPDUOutletControlMSP] Outlet Control OIDs	55
[sPDUOutletConfigMSPall] Outlet Configuration OIDs	56
[sPDUOutConfigMSPgs] Outlet Configuration OIDs	56
Example of a “Load-Shedding” Configuration 58	
[sPDUOutConfigMSPannun] Outlet Configuration OIDs	60
[sPDUOutConfigMSPmups] Outlet Configuration OIDs	61
[sPDUOutletStatusMSP] Outlet Status OIDs	63

Chapter 8: How to Manage an Automatic Transfer Switch 64

[atsIdent] Identification OIDs	65
[atsCalibration] Calibration OIDs	66
[atsControl] Control OIDs	67
[atsConfig] Configuration OIDs	67
[atsStatus] Status OIDs	68
[atsStatusInput] Input OIDs	70
[atsStatusOutput] Output OIDs	72

Chapter 9: PowerNet MIB Traps 74

Trap Severity Levels	75
How To Define Trap Receivers	75
PowerNet MIB Trap Definitions	76
Symmetra UPS Subtraps	85

About This Guide

This introduction provides the following information to help you use this guide.

- [Guide Purpose](#)
- [Guide Structure](#)
- [Related Documents](#)
- [Terms Used in This Guide](#)

For assistance with this or any other APC product, contact [APC Worldwide Customer Support](#) as described at the end of this manual.

Guide Purpose

This guide describes how to use the PowerNet management information base (MIB), version 3.4.4, to manage APC products that allow or enable using simple network management protocol (SNMP) for management:

- MIB version 3.4.4 management of a Management Card, UPS, and an Environmental Monitor
- MIB version 2.2-compatible management of a version 2.2 Agent, its UPS, and an Environmental Monitor
- MIB version 3.4.4 management of an APC MasterSwitch™ AC Power Controller, a MasterSwitch VM AC remote control PDU, or a MasterSwitch Plus AC remote control PDU
- MIB version 3.4.4 management of an APC Automatic Transfer Switch and its embedded Network Management Card.

Guide Structure

This guide's chapters describe how to use the PowerNet MIB:

- [Chapter 1, PowerNet MIB Structure](#)
Provides an overview of the PowerNet MIB, its Object Identifications (OIDs) and its traps (messages that alert a network management station [NMS] about specific conditions).
- [Chapter 2 through Chapter 8](#)
Describe how to use PowerNet MIB OIDs to manage specific products:
 - [Chapter 2, How to Manage Agents and Management Cards](#)
 - [Chapter 3, How to Manage a UPS](#)
 - [Chapter 4, How to Manage an Environmental Monitor](#)
 - [Chapter 5, How to Manage a MasterSwitch Unit](#)
 - [Chapter 6, How to Manage a MasterSwitch VM Unit](#)
 - [Chapter 7, How to Manage a MasterSwitch Plus Unit](#)

- [Chapter 8, How to Manage an Automatic Transfer Switch](#)
- [Chapter 9, PowerNet MIB Traps](#)
Describes the PowerNet MIB traps and how to define which NMSs can receive those traps.

Related Documents

This guide describes how to use the PowerNet MIB only. For information about an APC product that you manage using the PowerNet MIB, see the user's guide or owner's manual for that product. See your network management system (NMS) documentation for information about your NMS.

Terms Used in This Guide

Terms used in this guide have the following definitions:

Term Used in This Guide	Definition
Management Card	Unless otherwise stated, Management Card refers to any of the following devices: <ul style="list-style-type: none"> • Any PowerNet Adapter with model number AP9205, AP9605, or AP9603 • Any Web/SNMP Management Card • Any Network Management Card
PowerNet Agent, or Agent	Any PowerNet Agent
Environmental Monitor	Unless otherwise stated, Environmental Monitor refers to any of the following devices: <ul style="list-style-type: none"> • Measure-UPS • Measure-UPS II • Environmental Monitoring Card • Environmental Monitoring Device • Integrated Environmental Monitor (AP9618 and AP9619 Network Management Cards only)
MasterSwitch unit	In Chapter 5, How to Manage a MasterSwitch Unit , MasterSwitch unit refers to model numbers AP9210(i), AP9211, and AP9212. In the rest of this guide, MasterSwitch unit is used collectively to refer to any MasterSwitch unit, MasterSwitch VM unit, or MasterSwitch Plus unit.
Network management station or NMS	Any network component capable of using the PowerNet MIB

Chapter 1: PowerNet MIB Structure

This chapter categorizes the PowerNet MIB into its major OID and trap components as follows:

- [PowerNet MIB Traps](#)
- [PowerNet MIB OIDs](#)

PowerNet MIB Traps

Any Management Card, PowerNet Agent, or MasterSwitch unit can send traps to an NMS when specific events occur. The NMS does not need the PowerNet MIB to receive the trap, but it does need the MIB to interpret the trap's meaning. Also, the trap receiver definitions that a particular device or Agent uses determines which NMSs can receive traps.

For more information on traps, see [Chapter 9, PowerNet MIB Traps](#).

PowerNet MIB OIDs

The PowerNet MIB OIDs allow an NMS to use its SNMP browser to manage any of the following:

- A Management Card, its UPS and an Environmental Monitor
- A PowerNet Agent, its UPS and Environmental Monitor
- A MasterSwitch unit

However, the NMS can manage a device only if the SNMP access controls of that device allow the NMS to have SNMP access. (A PowerNet Agent, which has limited control over a UPS, does not use SNMP access controls.)

The following sections further explain how to use OIDs:

- [SNMP Access Controls](#)
- [SNMP Browser Structure](#)
- [PowerNet MIB OIDs Structure](#)
- [Tabled OIDs](#)

SNMP Access Controls

A Management Card or MasterSwitch unit has a console programs that you can use to define specific SNMP access values for up to four SNMP channels.

Action	Result
Disable SNMP access completely	Prevent SNMP access by any NMS.
Use an NMS IP Address as a SNMP channel value	Limit channel access to only the defined NMS.
Define a non-default password for an SNMP channel	Limit channel access to an NMS that knows the password.
Select the type of access used by an SNMP channel	Allow an NMS to have write access, read access, or no access.

For more information on SNMP access controls, see the *User's Guide* for your Management Card.

SNMP Browser Structure

The PowerNet MIB fits into a hierarchical structure within the SNMP browser's categories. For example, when you use an HP OpenView for Windows SNMP browser, PowerNet MIB OIDs fit into the browser's structure, as follows:

- **[iso]** (for International Standards Organization) at the top
- **[org]** (for organization) under **[iso]**
- **[dod]** (for Department of Defense) under **[org]**
- **[internet]** under **[dod]**
- **[private]** under **[internet]**
- **[enterprises]** under **[private]**
- **[apc]** (for American Power Conversion) under **[enterprises]**

PowerNet MIB OIDs Structure

The PowerNet MIB OIDs also are categorized into a hierarchical structure, with **[apc]** at the top and individual OIDs under specific OID categories or within specific OID tables. (See **Tabled OIDs**.) For example, under **[apc]** there are two categories: **[products]**, which provides the OIDs that you use to manage specific products, and **[apcmgmt]**, which provides OIDs that you use to affect the operation of hardware-based SNMP agents (Management Cards and MasterSwitch units). For more information on how to use the **[apcmgmt]** OIDs, see **Chapter 2, How to Manage Agents and Management Cards**.

Under **[products]**, there are three categories, two of which (**[hardware]** and **[software]**) provide OIDs that you use to manage specific products.

[hardware]	[software]
<p>This category contains sub-categories for each type of hardware product that you can manage using PowerNet MIB OIDs. The following chapters describe how to use the OIDs in those sub-categories:</p> <ul style="list-style-type: none"> • For [ups], see Chapter 3, How to Manage a UPS. • For [measureUps], see Chapter 4, How to Manage an Environmental Monitor. • For [miniSNMP adapter], see Chapter 2, How to Manage Agents and Management Cards. • For [masterswitch], see Chapter 5, How to Manage a MasterSwitch Unit. • For [masterswitchVM], see Chapter 6, How to Manage a MasterSwitch VM Unit. • For [masterswitchMSP], see Chapter 7, How to Manage a MasterSwitch Plus Unit. 	<p>This category includes read-only OIDs that you can use to monitor a software PowerNet Agent only (as described in Chapter 2, How to Manage Agents and Management Cards) and contains the one sub-category [powerNetSubAgent]</p>

The third listing, **[system]**, does not provide OIDs that you can use for SNMP management. The read-only OIDs that this category contains identify models of UPSs, Environmental Monitors, and MasterSwitch units by unique numbers that other OIDs can reference. For example, the MIB-II system OIDs (listed under **[internet]**, **[mgmt]**, **[mib-2]**, and **[system]**) use a PowerNet MIB **[system]** OID number for the MIB-II's **[sysObjectID]** value.

Tabled OIDs

For any PowerNet MIB OID category listed in the SNMP browser, you can access a list of the current values for all OIDs in that category and in all sub-categories below it in the hierarchy. For example, you can select **[apc]** to list the current values for all PowerNet MIB OIDs, or **[ups]** to list the current values for all PowerNet MIB UPS OIDs. However, OIDs grouped together in a table will not appear in such a list. You can access an OID table's values only by selecting that OID table in the SNMP browser. (An OID table appears enclosed in braces {}.) For example, to access the OIDs that define all four trap receivers for a device, select **{mconfigTrapReceiverTable}** in the SNMP browser.

For more information on how to define trap receivers, see [Chapter 9, PowerNet MIB Traps](#).

Chapter 2: How to Manage Agents and Management Cards

This chapter describes how to use PowerNet MIB OIDs to manage a Management Card, or to view software data for a PowerNet Agent. It also includes information on managing the SNMP agent of a MasterSwitch unit or Automatic Transfer Switch.

In the following cases, the network connection allows an NMS to use an SNMP browser and PowerNet MIB OIDs to manage the UPS, Environmental Monitor, MasterSwitch unit, or Automatic Transfer Switch.

- A Web/SNMP Management Card or Network Management Card enables Web-based or SNMP-based monitoring of a UPS, Environmental Monitor, MasterSwitch unit, or Automatic Transfer Switch (which has an embedded Network Management Card).
- A PowerNet Management Card allows SNMP-based monitoring of a UPS and Environmental Monitor.
- A PowerNet Agent indirectly connects a UPS and an Environmental Monitor to the network by communicating with a PowerChute *plus* application, which, in turn, communicates with the UPS and Environmental Monitor.

In addition to using SNMP to manage a device connected to the network by a Management Card or PowerNet Agent, the NMS can also use PowerNet MIB OIDs to manage any Management Card, Environmental Monitor, MasterSwitch unit, or Automatic Transfer Switch, or to monitor software values for the PowerNet Agent.

OIDs	Tasks
[powerNetSubAgent] read-only OIDs	View information about a PowerNet Agent. (See How to Monitor a PowerNet Agent.)
[apcmgmt] OIDs	Manage the internal SNMP Agent at a hardware device. (See How to Manage the SNMP Agent at a Hardware Device.)

How to Monitor a PowerNet Agent

You can use [powerNetSubAgent] read-only OIDs to view information about a PowerNet Agent by performing the following steps:

1. Select [products] under [apc].
2. Select [software].
3. Select [powerNetSubAgent].

The SNMP browser lists two OID categories: [powerNetSoftwareSystem] and [powerNetSoftwareConfig].

[powerNetSoftwareSystem]

The following table describes the [powerNetSoftwareSystem] OIDs.

OID	Information Provided
powerNetSoftwareSystemDescription	Information about an Agent, including its version number.
powerNetSoftwareOid	The technology that the Agent uses to implement the PowerNet MIB.
powerNetSoftwareSystemUpTime	The length of time that the Agent has been continuously running on the network.

[powerNetSoftwareConfig]

The following table describes the [powerNetSoftwareConfig] OIDs.

OID	Information Reported
powerNetSoftwareTableSize	The number of distinct software modules that an Agent has.
{powerNetSoftwareTable} {powerNetSoftwareEntry} moduleNumber moduleName moduleVersion moduleDate	A tabled set of OIDs that define each module by these module characteristics: <ul style="list-style-type: none">• Table row number• Name• Version number• Installation date, in the format <i>mm-dd-yy</i>

How to Manage the SNMP Agent at a Hardware Device

When you select [apcmgmt] under [apc], the SNMP browser lists four OID categories: [mcontrol], [mconfig], [mtrapargs], and [mfiletransfer]. In these categories, you can use the OIDs documented in this guide to manage the SNMP Agent at a hardware device (ManagementCard, Environmental Monitor, MasterSwitch unit, or Automatic Transfer Switch).

[mcontrol]

The following table describes the one OID in the **[mcontrol]** category. Value **(3)**, not documented, is obsolete.

OID	Values You Can SET
mcontrolRestartAgent	restartCurrentAgent (1) : Reboots the SNMP Agent. continueCurrentAgent (2) : Continues the Agent without rebooting. restartWithoutAgent (4) : Restarts the system without starting the Agent. The next time the system restarts, the Agent also restarts.

[mconfig]

The following table describes the **[mconfig]** OIDs.

OID	Task
mconfigBOOTPEnabled	Identify the current BOOTP setting. A GET to this OID returns one of the following: <ul style="list-style-type: none"> • yes (1): Enable BOOTP. The hardware device will obtain its IP configuration parameters from a BOOTP server. • no (2): Disable BOOTP. The hardware device will use the IP configuration parameters stored in its EPROM.
mconfigNumTrapReceivers	Identify how many NMSs can receive traps from the Agent. A GET to this OID returns a value from 0 to 4.
{mconfigTrapReceiverTable} {mconfigTrapReceiverEntry} trapIndex receiverAddr communityString severity acceptThisReceiver receiveTrapType	Use this tabled set of OIDs to define up to four NMSs as trap receivers. See How To Define Trap Receivers in Chapter 9, PowerNet MIB Traps for information on the OIDs in this table.
mconfigClock	Configure the date and time on a Web/SNMP Management Card, Network Management Card, or MasterSwitch unit. <ul style="list-style-type: none"> • mconfigClockDate in <i>mm/dd/yyyy</i> format • mconfigClockTime in <i>hh:mm:ss am/pm</i> format

See [How To Define Trap Receivers in Chapter 9, PowerNet MIB Traps](#) for information on how to define trap receivers.

[mtrapargs]

The following table describes the [mtrapargs] OIDs, which enable APC traps to use a specific type of argument, which, in each case, may not be defined as part of the APC MIB.

OID	Argument That APC Traps Are Allowed to Use
mtrapsapargsInteger	An integer argument.
mtrapsapargsIpAddress	An IP address argument.
mtrapsapargsString	An octet string argument.
mtrapsapargsGauge	A Gauge argument.
mtrapsapargsTimeTicks	A TimeTicks argument.

[mfiletransfer]

The [mfiletransfer] OIDs, which are supported only by a PowerNet Management Card, allow transfers of any type of file that the card can recognize. For more information, see the *User's Guide* for your PowerNet Management Card.

The OID categories under the [mfiletransfer] category are [mfiletransferStatus], [mfiletransferConfig], and [mfiletransferControl].

[mfiletransferStatus]

The following table describes the one OID in the [mfiletransferStatus] category.

OID	Information Provided
mfiletransferStatusLastFileTransferResult	<p>One of the following results of the last attempted file transfer:</p> <ul style="list-style-type: none"> lastFileTransferResultSuccessful (1) lastFileTransferResultNotAvailable (2): If this value is returned, there have been no previous file transfers. lastFileTransferResultFailureUnknown (3) lastFileTransferResultFailureServerInaccessible (4) lastFileTransferResultFailureServerAccessDenied (5) lastFileTransferResultFailureFileNotFound (6) lastFileTransferResultFailureFileTypeUnknown (7) lastFileTransferResultFailureFileCorrupted (8)

[mfiletransferConfig]

The following table describes the three sub-categories in the **[mfiletransferConfig]** category and the OIDs in each of those sub-categories.

OID Sub-category	OIDs in Each Sub-category
[mfiletransferConfigSettings]	mfiletransferConfigSettingsFileName : The name and path of the file to be transferred.
[mfiletransferConfigTFTP]	mfiletransferConfigTFTPServerAddress : The IP Address of the remote TFTP Server.
[mfiletransferConfigFTP]	mfiletransferConfigFTPServerAddress : The IP Address, in decimal notation, of the remote FTP Server involved in the file transfer. mfiletransferConfigFTPServerUser : The FTP Server User Name. mfiletransferConfigFTPServerPassword : The FTP Server Password.

[mfiletransferControl]

The following table describes the one OID in the **[mfiletransferControl]** category.

OID	Task
mfiletransferControlInitiateFileTransfer	doNotInitiateFileTransfer (1) : Do nothing. initiateFileTransferDownloadViaTFTP (2) : Download file from the TFTP Server. initiateFileTransferDownloadViaFTP (3) : Download file from the FTP Server.

Chapter 3: How to Manage a UPS

This chapter describes how to use PowerNet MIB OIDs to manage a UPS through its Management Card or its PowerNet Agent.

The PowerNet MIB OIDs that you can use to manage (monitor, configure, control and test) a UPS are in nine categories under the heading **[ups]**. To list the nine categories, perform the following steps:

1. Select **[products]** under **[apc]**.
2. Select **[hardware]**.
3. Select **[ups]**.

OID Categories	Tasks
[upsIdent] [upsBattery] [upsInput] [upsOutput] [upsComm]	View information about the UPS and its overall operation. (See How to Monitor a UPS .)
[upsConfig]	Modify parameters that affect the overall operation of the UPS. (See How to Configure a UPS .)
[upsControl]	Directly affect the current operation of the UPS. (See How to Control a UPS .)
[upsTest]	Verify that the UPS can operate correctly during a power failure. (See How to Test a UPS .)
[upsPhase]	Provide OIDs directly related to 3-phase UPS models. (See How to Use OIDs for 3-Phase UPS Models .)

The following factors determine which OIDs in the **[ups]** categories can be used to manage a UPS:

- The manner in which the UPS connects to the network.
- For a PowerNet Agent, the type of signalling used for the connection between the Agent and the UPS: basic (simple-signalling) and advanced (smart-signalling).

Management Card	PowerNet Agent
You can use all OIDs listed under the [ups] category of the PowerNet MIB.	You cannot use the following: <ul style="list-style-type: none"> • Any [ups] OIDs not originally supported for PowerNet Agents in PowerNet MIB version 2.2. • Smart-signalling (advanced) OIDs, if the Agent- to-UPS communication uses simple-signalling.

How to Monitor a UPS

You use **GETs** (SNMP read commands) to PowerNet MIB OIDs to monitor (view information about) the UPS.

Most PowerNet MIB categories have OIDs that you can use to view information about the operation of the UPS. With few exceptions, these OIDs respond to **GETs**, but not to **SETs**: You can view (**GET**) information about UPS operation, but you cannot affect (**SET**) that operation.

OID Categories	Information Reported
[upsIdent]	The UPS identification parameters. See [upsIdent] UPS Identification OIDs.
[upsBattery]	The UPS battery status. See [upsBattery] UPS Battery OIDs.
[upsComm]	The UPS-to-SNMP agent communication link. See [upsComm] UPS Communication OID.
[upsInput]	The voltage input to the UPS. See [upsInput] UPS Input OIDs.
[upsOutput]	The voltage output by the UPS. See [upsOutput] UPS Output OIDs.

Not every PowerNet MIB OID responds to a **GET** with useful information. For example:

- A **GET** to any [upsControl] OID receives a response indicating that the UPS did not perform the related control action.
- A **GET** to [upsAdvControlFlashAndBeep] receives a **noFlashAndBeep (1)** response.
- A **GET** to [upsAdvControlRebootUps] receives a **noRebootUps (1)** response.

[upsIdent] UPS Identification OIDs

The [upsIdent] category has five OIDs in two sub-categories, [upsBasicIdent] and [upsAdvIdent] that report UPS identification parameter values. Four read-only OIDs report values pre-set at the factory, and one OID reports the name used for the UPS, a name that you can define using a **SET**.

You can access all five OIDs through any Management Card or PowerNet Agent that connects to the UPS through a smart-signalling cable. For a PowerNet Agent that connects to the UPS through a simple-signalling cable, you can use only the two [upsBasicIdent] OIDs.

[upsBasicIdent]

OID	Information Reported
upsBasicIdentModel	The UPS model name.
upsBasicIdentName	The 8-character name for the UPS. You can use a SET to change this value.

[upsAdvIdent]

OID	Information Reported
upsAdvIdentFirmwareRevision	The UPS firmware version.
upsAdvIdentDateOfManufacture	The date on which the UPS completed the manufacturing process.
upsAdvIdentSerialNumber	The UPS serial number.

[upsBattery] UPS Battery OIDs

The [upsBattery] category has nine OIDs in two sub-categories, [upsBasicBattery] and [upsAdvBattery] that provide UPS battery status information. Eight are read-only OIDs, and one OID reports when the battery was replaced last, a value that you can define by using a **SET**.

You can access all nine OIDs through any Management Card or through a PowerNet Agent that connects to the UPS through a smart-signalling cable. For a PowerNet Agent that connects to the UPS through a simple-signalling cable, you can use only the three [upsBasicBattery] OIDs.

[upsBasicBattery]

OID	Information Reported
upsBasicBatteryStatus	The current UPS battery status: <ul style="list-style-type: none"> • unknown (1): The Management Card or PowerNet Agent cannot report the status. • batteryNormal (2): Within normal operating parameters. • batteryLow (3): Insufficient battery capacity to support the UPS equipment load.
upsBasicTimeOnBattery	The amount of time since the UPS switched to battery power.
upsBasicBatteryLastReplaceDate	The date on which the battery was last replaced, a value you can change by using a SET . The format is <i>mm/dd/yy</i> or <i>mm/dd/yyyy</i> .

[upsAdvBattery]

OID	Information Reported
upsAdvBatteryCapacity	The battery's remaining capacity as a percentage of full battery capacity.
upsAdvBatteryTemperature	The internal temperature of the UPS, in Celsius.
upsAdvBatteryRunTimeRemaining	How long the UPS battery can provide output voltage.
upsAdvBatteryReplaceIndicator	Whether a UPS battery needs replacement: <ul style="list-style-type: none"> • noBatteryNeedsReplacing (1) • batteryNeedsReplacing (2)
upsAdvBatteryNumOfBattPacks	The number of external battery packs a Matrix-UPS or Smart-UPS XL has.
upsAdvBatteryNumOfBadBattPacks	The number of defective external battery packs that a Matrix-UPS or Smart-UPS XL has.

[upsComm] UPS Communication OID

This category has a single read-only OID that you can access through any Management Card but not through a PowerNet Agent.

OID	Information Reported
upsCommStatus	The status of the Management Card's SNMP agent-to-UPS communication link: <ul style="list-style-type: none"> • ok (1) • noComm (2)

[upsInput] UPS Input OIDs

The **[upsInput]** category has six read-only OIDs in two sub-categories, **[upsBasicInput]** and **[upsAdvInput]**, that provide information about the UPS input (utility line) voltage.

You can access all six OIDs through any Management Card or through a PowerNet Agent that connects to the UPS through a smart-signalling cable. For a PowerNet Agent that connects to the UPS through a simple-signalling cable, you can use only the **upsBasicInputPhase** OID.

[upsBasicInput]

OID	Information Reported
upsBasicInputPhase	The current AC input voltage phase.

[upsAdvInput]

OID	Information Reported
upsAdvInputLineVoltage	The current input voltage in VAC.
upsAdvInputMaxLineVoltage	The maximum input voltage, in VAC, sensed by the UPS during the last minute.
upsAdvInputMinLineVoltage	The minimum input voltage, in VAC, sensed by the UPS during the last minute.
upsAdvInputFrequency	The current input voltage frequency in Hertz.
upsAdvLineFailCause	<p>The reason for the most recent transfer to battery.</p> <ul style="list-style-type: none"> • Any Management Card or smart-signalling PowerNet Agent can report the following: <ul style="list-style-type: none"> - noTransfer (1): No transfer has occurred. - highLineVoltage (2): Voltage exceeded the high-transfer voltage value. - brownout (3): For more than 5 seconds, the voltage level was between 40% of the UPS rated output voltage and the low-transfer voltage value. - blackout (4): For more than 5 seconds, the voltage level was between 40% of the UPS rated output voltage and ground [0 volts]. - smallMomentarySag (5): A brownout existed for 5 seconds or less. - deepMomentarySag (6): A blackout existed for 5 seconds or less. - smallMomentarySpike (7): Less than 10 volts per cycle voltage increase. - largeMomentarySpike (8): More than 10 volts per cycle voltage increase. • A Management Card can also report the occurrence of a UPS self-test, self-test (9), and the rate of changes in the line voltage level, rateOfVoltageChange (10).

See [How to Configure a UPS](#) for information about the following values mentioned in the descriptions of **[upsAdvLineFailCause]** OID values in the preceding table:

- Rated output of the UPS
- The high-transfer voltage value
- The low-transfer voltage value

[upsOutput] UPS Output OIDS

The [upsOutput] category has six read-only OIDs in two subcategories, [upsBasicOutput] and [upsAdvOutput], that provide information about the UPS output voltage.

You can access all six OIDs through any Management Card. A PowerNet Agent that connects to the UPS through a smart-signalling cable can use all the OIDs except **upsAdvOutputCurrent**. A PowerNet Agent that connects to the UPS through a simple-signalling cable can use only the two [upsBasicOutput] OIDs.

[upsBasicOutput]

OID	Information Reported
upsBasicOutputStatus	<p>The current UPS operational status:</p> <ul style="list-style-type: none"> • unknown (1): The Management Card or PowerNet Agent cannot determine the state of the UPS. • onLine (2): The UPS is using acceptable input voltage to provide output voltage. • onBattery (3): The UPS is using battery power to provide output voltage. • onSmartBoost (4): The UPS is using its AVR Boost feature with a low input voltage to provide sufficient output voltage without switching to battery operation. • timedSleeping (5): The UPS is waiting a defined period of time before supplying output power to its supported equipment. • softwareBypass (6): The Matrix-UPS or Symmetra UPS was placed into bypass mode using SNMP, PowerChute <i>plus</i> or PowerNet Manager. • off (7): The UPS is turned off. • rebooting (8): The UPS is resetting its supported equipment by turning off its output power and then turning it back on. • switchedBypass (9): The Matrix-UPS or Symmetra UPS was placed into bypass mode using the switch at the UPS. • hardwareFailureBypass (10): The Matrix-UPS or Symmetra UPS placed itself into bypass mode in response to a hardware problem. • sleepingUntilPowerReturn (11): The UPS is waiting for input power to return to an acceptable level before it provides output power to its supported equipment. • onSmartTrim (12): The UPS is using its AVR Trim feature with a high input voltage to provide output voltage without switching to battery operation.
upsBasicOutputPhase	The current output phase.

[upsAdvOutput]

OID	Information Reported
upsAdvOutputVoltage	The output voltage of the UPS in VAC.
upsAdvOutputFrequency	The output voltage frequency of the UPS in Hertz.
upsAdvOutputLoad	The equipment load placed on the UPS by its supported equipment as a percentage of rated load capacity.
upsAdvOutputCurrent	The output voltage current in Amperes

How to Control a UPS

You can use **SETs** (SNMP write commands) to the **[upsControl]** OIDs to directly affect the current operation of the UPS

[upsControl] OIDs

Which **[upsControl]** OIDs you can use depends on how the UPS connects to the network. The **[upsControl]** category has two subcategories

- **[upsBasicControl]** for simple-signalling connections.
- **[upsAdvControl]** for smart-signalling connections.

[upsBasicControl]


The **[upsBasicControl]** category has one OID, which any Management Card or PowerNet Agent can use to put a UPS that is running on battery into “sleep mode.”

OID	Task
upsBasicControlConserveBattery	<p>Cause a UPS running on battery to turn off its outlets to conserve battery runtime and then wait in “sleep mode” until acceptable input power returns.</p> <ul style="list-style-type: none"> • noTurnOffUps (1): The value always returned for a GET. Setting this value has no effect. • turnOffUpsToConserveBattery (2): The UPS, if running on battery, waits in “sleep mode” until acceptable input power returns. If the UPS is not on battery, a badValue error is returned.

[upsAdvControl]

Management Cards and PowerNet Agents that use smart-signalling to connect with the UPS can use **SETs** to the OIDs in the [upsAdvControl] category, with the following exceptions:

- Three OIDs each have a value that you can use **only with a Management Card**.
 - The **upsAdvControlUpsOff** OID's value of **turnUpsOffGracefully (3)**.
 - The **upsAdvControlRebootUps** OID's value of **rebootUpsGracefully (3)**.
 - The **upsAdvControlUpsSleep** OID's value of **putUpsToSleepGracefully (3)**.

OID	Task (page 1 of 2)
upsAdvControlUpsOff	<p>Cause the UPS to turn off. How the UPS turns off depends on what SET value is used and how the UPS connects to the network:</p> <ul style="list-style-type: none"> • noTurnUpsOff (1): The value always returned for a GET. Setting this value has no effect. • turnUpsOff (2): All Management Cards turn off the UPS immediately. • turnUpsOffGracefully (3): <ul style="list-style-type: none"> - A PowerNet Agent performs an orderly shutdown of the UPS server, then turns off the UPS. - A Management Card turns off a UPS after the delay defined by upsAdvConfigShutoffDelay, a UPS configuration OID. (See How to Configure a UPS.) <p> <i>Note:</i> When you use the upsAdvControlUpsOff OID with a PowerNet Agent, you can turn on the UPS again only by using the UPS on/off switch. For all Management Cards, you can turn on the UPS again by using a SET value of turnOnUPS (2) for the upsAdvControlTurnOnUPS OID.</p>
upsAdvControlRebootUps	<p>Cause the UPS to reset its supported equipment by turning power off and then back on:</p> <ul style="list-style-type: none"> • noRebootUps (1): The value always returned for a GET. Setting this value has no effect. • rebootUps (2): All Management Cards reboot the UPS immediately. • rebootUpsGracefully (3): A Management Card reboots a UPS, using a delay before it turns off the UPS. The UPS uses the delay value defined by upsAdvConfigShutoffDelay, a UPS configuration OID. (See How to Configure a UPS.)

OID	Task (page 2 of 2)
upsAdvControlUpsSleep	<p>Cause the UPS to turn off its outlets and wait in “sleep mode” for the period of time defined by upsAdvConfigUpsSleepTime, a UPS configuration OID (See How to Configure a UPS.)</p> <ul style="list-style-type: none"> • noPutUpsToSleep (1): The value always returned for a GET. Setting this value has no effect. • putUpsToSleep (2): All Management Cards turn off UPS power immediately. • putUpsToSleepGracefully (3): A Management Card turns off UPS power after a delay defined by upsAdvConfigShutoffDelay, a UPS configuration OID. (See How to Configure a UPS.)
upsAdvControlSimulatePowerFail	<p>Cause the UPS to test its ability to switch to battery operation as it would in a power failure:</p> <ul style="list-style-type: none"> • noSimulatePowerFailure (1): The value always returned for a GET. Setting this value has no effect. • simulatePowerFailure (2): The UPS performs this test.
upsAdvControlFlashAndBeep	<p>Cause the UPS to test its front panel lights (if any) and its audible alarm:</p> <ul style="list-style-type: none"> • noFlashAnd Beep (1): The value always returned for a GET. Setting this value has no effect. • flashAndBeep (2): The UPS performs this test.
upsAdvControlTurnOnUPS	<p>Cause a Management Card’s UPS to turn on:</p> <ul style="list-style-type: none"> • noTurnOnUPS (1): The value always returned for a GET. Setting this value has no effect. • turnOnUPS (2): The UPS turns on, if that UPS was turned off using the upsAdvControlUpsOff OID.
upsAdvControlBypassSwitch	<p>Switch a Matrix-UPS or Symmetra UPS to or from software bypass mode:</p> <ul style="list-style-type: none"> • noBypassSwitch (1): The value always returned for a GET. Setting this value has no effect. • switchToBypass (2): The UPS switches to bypass mode. • switchOutOfBypass (3): The UPS switches from bypass mode to normal operation.

How to Configure a UPS

You can use the OIDs in the **[upsConfig]** category to define how the UPS responds to specific operating conditions.

[upsConfig]

Which **[upsConfig]** OIDs you can use depends on how the Management Card or PowerNet Agent connects to the UPS. The **[upsConfig]** category has two subcategories:

- **[upsBasicConfig]** for simple-signalling connections, which provide basic power management and protection but offer few additional configuration and monitoring options. (A Back-UPS supports only simple-signalling.)
- **[upsAdvConfig]** for smart-signalling connections, which provide full support for the advanced configuration and monitoring options available on all APC UPSs except Back-UPS.

[upsBasicConfig]

The **[upsBasicConfig]** category has one read-only OID and a tabled set of OIDs that you can use to view or define information about the equipment supported by the UPS.

OID	Task
upsBasicConfigNumDevices	Identify the number of devices specified in the tabled set of OIDs {upsBasicConfigDeviceTable} , i.e. the number of devices plugged into the UPS.
{upsBasicConfigDeviceTable} {upsBasicConfigDeviceEntry} deviceIndex deviceName vaRating acceptThisDevice	View or define information about the equipment supported by each UPS outlet: <ul style="list-style-type: none"> • View read-only value that identifies the specific outlet. • Define a 16-character name for the device at this outlet. • Define the VA rating of the device this outlet supports Add a device entry to the table or delete an existing device entry: <ul style="list-style-type: none"> • yes (1): Add an entry. • no (2): Delete an entry.

[upsAdvConfig]

The OIDs in the [upsAdvConfig] category enable you to view or configure operating and shutdown parameters for a UPS connected in smart-signalling mode. A Management Card can use all the OIDs in this category. A PowerNet Agent can use all but four of the OIDs, as noted in the following table.

OID	Task (page 1 of 3)
upsAdvConfigRatedOutputVoltage ¹	Define the UPS nominal VAC output voltage. This value is read-only for most 120 VAC UPSs.
upsAdvConfigHighTransferVolt ¹	Define the input voltage at which the UPS will switch to its AVR Boost feature. If the UPS does not support AVR Boost, it switches to battery operation instead. (A Matrix-UPS, for example, does not support AVR Boost.)
upsAdvConfigLowTransferVolt ²	Define the input voltage at which the UPS will switch to its AVR Trim feature. If the UPS does not support AVR Trim, it switches to battery operation instead. (A Matrix-UPS, for example, does not support AVR Trim.)
upsAdvConfigAlarm	Define when the UPS will generate an audible alarm for a line-fail condition: <ul style="list-style-type: none"> • timed (1): After the UPS switches to battery operation and waits the delay defined by the upsAdvConfigAlarmTimer OID. • atLowBattery (2): When a low-battery condition occurs. • never (3): No alarm occurs
upsAdvConfigAlarmTimer	Define how long in seconds the UPS must wait after switching to battery operation before it can generate an alarm when timed (1) is the value for the upsAdvConfigAlarm OID. The only allowed values are 0 and 30. If you use any value of 1 second or more, the value is set to 30. If you use any value less than 1 second, the value is set to 0.
upsAdvConfigMinReturnCapacity ²	Define the battery capacity (as a percentage of full capacity) required before the UPS can return from a low-battery shutdown.
<p>¹ If a SET specifies an unsupported value, the UPS interprets the value as the next lower allowed value, as defined by the apcUpsConfigFieldValueRange OID in the tabled set of OIDs {upsAdvConfigAllowedSetTable}. If the value is less than the lowest allowable value, the lowest allowed value is used.</p> <p>² If a SET specifies an unsupported value, the UPS interprets the value as the next higher allowed value, as defined by the apcUpsConfigFieldValueRange OID in the tabled set of OIDs {upsAdvConfigAllowedSetTable}. If the value is higher than the highest allowable value, the highest allowed value is used.</p>	

OID	Task (page 2 of 3)
upsAdvConfigSensitivity	<p>Define the sensitivity of the UPS to input line abnormalities or “noise.”</p> <ul style="list-style-type: none"> • auto (1): The only setting recognized by UPSs with automatic voltage regulators, e.g Matrix-UPS and Symmetra UPS. • low (2) • medium (3) • high (4)
upsAdvConfigLowBatteryRunTime²	Define when a low-battery condition will occur, based on how much battery runtime remains, in seconds.
upsAdvConfigReturnDelay²	Define the time in seconds that a UPS in sleep mode will wait after input power returns before turning on its power outlets. (In sleep mode, a UPS waits, with its power outlets turned off, for input power to return.)
upsAdvConfigShutoffDelay²	Define the delay time, in seconds, used for graceful turn-off, reboot, and sleep-control options. (See How to Control a UPS .) Only Management Cards can use this OID.
upsAdvConfigUpsSleepTime	Define how long the UPS will remain in timed sleep, specified as a multiple of 360 seconds (6 minutes). If a SET provides a value that is not a multiple of 360, the UPS rounds the value to the nearest multiple of 360, except that any value from 1 through 540 is rounded to 360. Only Management Cards can use this OID.
upsAdvConfigSetEEPROMDefaults	<p>Reset the UPS configuration values to the values set at the factory. Only Management Cards can use this OID.</p> <ul style="list-style-type: none"> • noSetEEPROMDefaults (1): The value always returned by a GET. Setting this value has no effect. • setEEPROMDefaults (2): Resets the values.
upsAdvConfigPassword	Define the 4-byte password used for front-panel access to a Matrix-UPS or Symmetra UPS. Only Management Cards can use this OID.
<p>¹ If a SET specifies an unsupported value, the UPS interprets the value as the next lower allowed value, as defined by the apcUpsConfigFieldValueRange OID in the tabled set of OIDs {upsAdvConfigAllowedSetTable}. If the value is less than the lowest allowable value, the lowest allowed value is used.</p> <p>² If a SET specifies an unsupported value, the UPS interprets the value as the next higher allowed value, as defined by the apcUpsConfigFieldValueRange OID in the tabled set of OIDs {upsAdvConfigAllowedSetTable}. If the value is higher than the highest allowable value, the highest allowed value is used.</p>	

OID	Task (page 3 of 3)
{upsAdvConfigAllowedSetTable} {apcUpsConfigEntry} apcUpsConfigFieldIndex apcUpsConfigFieldOID apcUpsConfigFieldValueRange	Obtain the allowed values for all settable OIDs in the [upsAdvConfig] group. <ul style="list-style-type: none"> • The index to an EEPROM field entry. • The OID of the current configurable value. • A comma-delimited list of allowed values for the OID
<p>¹ If a SET specifies an unsupported value, the UPS interprets the value as the next lower allowed value, as defined by the apcUpsConfigFieldValueRange OID in the tabled set of OIDs {upsAdvConfigAllowedSetTable}. If the value is less than the lowest allowable value, the lowest allowed value is used.</p> <p>² If a SET specifies an unsupported value, the UPS interprets the value as the next higher allowed value, as defined by the apcUpsConfigFieldValueRange OID in the tabled set of OIDs {upsAdvConfigAllowedSetTable}. If the value is higher than the highest allowable value, the highest allowed value is used.</p>	

How to Test a UPS

This section contains information on using OIDs to perform UPS self-tests and runtime calibrations.

[upsTest]

The **[upsTest]** category contains the **[upsAdvTest]** sub-category for use by smart-signalling Management Cards or PowerNet Agents. There are no OIDs in the **[upsTest]** category for performing self-tests and calibrations for UPSs connected in simple-signalling mode because simple-signalling does not support those functions.

[upsAdvTest]

You can use the OIDs in the **[upsAdvTest]** sub-category to schedule or initiate UPS self-tests and runtime calibrations and to view the results of UPS self-tests.

The OIDs in this sub-category have the following limitations on their use:

- A Management Card can use all these OIDs except **upsAdvTestLastDiagnosticsDate**, which can be used only by a PowerNet Agent.
- A PowerNet Agent can use all these OIDs except **upsAdvTestRuntimeCalibration**, which can be used only by a Management Card

OID	Task
upsAdvTestDiagnosticSchedule	<p>Define the self-test schedule for the UPS:</p> <ul style="list-style-type: none"> • unknown (1): The Management Card or Agent cannot determine the setting. • biweekly (2): Self-tests will occur bi-weekly. • weekly (3): A self-test will occur once every week. • atTurnOn (4): A self-test will occur whenever the UPS turns on. • never (5): No self-test will be performed.
upsAdvTestDiagnostics	<p>Cause the UPS to perform an immediate self-test.</p> <ul style="list-style-type: none"> • noTestDiagnostics (1): The value always returned by a GET. Setting this value has no effect. • testDiagnostics (2): Perform the test.
upsAdvTestDiagnosticsResults	<p>View the result of the last self-test:</p> <ul style="list-style-type: none"> • ok (1): • failed (2): • invalidTest (3): • testInProgress (4):
upsAdvTestLastDiagnosticDate	<p>View the date (in <i>dd/mm/yy</i> format) of the last UPS self-test. Only smart-signalling PowerNet Agents use this OID.</p>
upsAdvTestRuntimeCalibration	<p>Control a runtime calibration:</p> <ul style="list-style-type: none"> • noPerformCalibration (1): The value always returned by a GET. Setting this value has no effect. • performCalibration (2): Starts a runtime calibration, if the UPS battery is at 100% capacity. If the battery capacity is not at 100%, a SET of this value results in an invalidCalibration setting for the upsAdvTestCalibrationResults OID. • cancelCurrentCalibration (3): Cancels a runtime calibration. <p>Only a Management Card can use this OID.</p>
upsAdvTestCalibrationResults	<p>View the result of the last runtime calibration:</p> <ul style="list-style-type: none"> • ok (1): The runtime calibration was successful. • invalidCalibration (2): The last calibration requested did not take place because battery capacity was less than 100%. • calibrationInProgress (3): A calibration is occurring now.
upsAdvTestCalibrationDate	<p>View the date (in <i>dd/mm/yy</i> format) of the last runtime calibration. Only smart-signalling PowerNet Agents use this OID.</p>

How to Use OIDs for 3-Phase UPS Models

The **[upsPhase]** category has OIDs in three subcategories

- **[upsPhaseResetValues]**: Set of OIDs you use to reset the counters for the corresponding OID in the **[upsPhaseInput]** and **[upsPhaseOutput]** groups that report minimum and maximum values.
- **[upsPhaseInput]**: Set of OIDs you use to obtain information about the input phases.
- **[upsPhaseOutput]**: Set of OIDs you use to obtain information about the output phases.

To access the values of OIDs in a table, select the OID table in the SNMP browser. (An OID table appears enclosed in braces {}.) For example, to access the OIDs that provide information on all input phases for a device, select **{upsPhaseInputPhaseTable}** in the SNMP browser, and then select **[upsPhaseInputEntry]** to see each OID in the table.

[upsPhaseResetValues]

Use an OID in the **[upsPhaseReset Values]** group to reset the counters for the corresponding OID in the **[upsPhaseInput]** and **[upsPhaseOutput]** groups that report minimum and maximum values.

OID	Task
upsBasicControlConserveBattery upsPhaseInputMaxVoltage upsPhaseInputMinVoltage upsPhaseInputMaxCurrent upsPhaseInputMinCurrent upsPhaseInputMaxPower upsPhaseInputMinPower upsPhaseOutputMaxCurrent upsPhaseOutputMinCurrent upsPhaseOutputMaxLoad upsPhaseOutputMinLoad upsPhaseOutputMaxPercentLoad upsPhaseOutputMinPercentLoad upsPhaseOutputMaxPower upsPhaseOutputMinPower upsPhaseOutputMaxPercentPower upsPhaseOutputMinPercentPower	Resets the counter for the corresponding OID in the [upsPhaseInput] and [upsPhaseOutput] groups. For example, to reset the counter for the OID in the [upsPhaseInput] category that reports the maximum input current (upsPhaseInputMaxCurrent), SET to the OID with that name in this [upsPhaseResetValues] category.

[upsPhaseInput]

All of the OIDs in this category are read-only except for the **upsPhaseInputName** OID, a {upsPhaseInputEntry} in the {upsPhaseInputTable}.

OID	Task
upsPhaseNumInputs {upsPhaseInputTable} {upsPhaseInputEntry} upsPhaseInputTableIndex upsPhaseNumInputPhases upsPhaseInputVoltageOrientation upsPhaseInputFrequency upsPhaseInputType upsPhaseInputName	Use these read-only OIDs to obtain information about the number of input feeds to the UPS, and information about each of those feeds.
(upsPhaseInputPhaseTable) {upsPhaseInputPhaseEntry} upsPhaseInputPhaseTableIndex upsPhaseInputPhaseIndex upsPhaseInputVoltage upsPhaseInputMaxVoltage upsPhaseInputMinVoltage upsPhaseInputCurrent upsPhaseInputMaxCurrent upsPhaseInputMinCurrent upsPhaseInputPower upsPhaseInputMaxPower upsPhaseInputMinPower	Use the read-only OIDs to obtain the following information for each input phase: <ul style="list-style-type: none"> • The input voltage, input current, and input power now. • The minimum and maximum value recorded for the input voltage, input current, and input power since the corresponding counters were reset by the OIDs in the [upsPhaseResetValues] group. The number of entries in the table depends on the sum of the values reported for upsPhaseNumInputPhases in the {upsPhaseInputTable} described above.

[upsPhaseOutput]

All of the OIDs in this category are read-only except for the **upsPhaseOutputName** OID, a **{upsPhaseOutputEntry}** in the **{upsPhaseOutputTable}**.

OID	Task
upsPhaseNumOutputs {upsPhaseOutputTable} {upsPhaseOutputEntry} upsPhaseOutputTableIndex upsPhaseNumOutputPhases upsPhaseOutputVoltageOrientation upsPhaseOutputFrequency upsPhaseOutputName	Use these read-only OIDs to obtain information about the number of output feeds to the UPS, and information about each of those feeds.
(upsPhaseInputPhaseTable) {upsPhaseInputPhaseEntry} upsPhaseInputPhaseTableIndex upsPhaseInputPhaseIndex upsPhaseInputVoltage upsPhaseInputMaxVoltage upsPhaseInputMinVoltage upsPhaseInputCurrent upsPhaseInputMaxCurrent upsPhaseInputMinCurrent upsPhaseInputPower upsPhaseInputMaxPower upsPhaseInputMinPower	Use the read-only OIDs to obtain the following information for each input phase: <ul style="list-style-type: none"> • The output voltage, output current, output load and output power now. • The minimum and maximum value recorded for the output voltage, output current, output load and output power since the corresponding counters were reset by the OIDs in the [upsPhaseResetValues] group. The number of entries in the table depends on the sum of the values reported for upsPhaseNumOutputPhases in the {upsPhaseOutputTable} above.

Chapter 4: How to Manage an Environmental Monitor

This chapter describes how to use the following PowerNet MIB OIDs to manage (monitor, configure, and control) an Environmental Monitor through its Management Card or PowerNet Agent.

- **External Environmental Monitor (em) OIDs**
- **Integrated Environmental Monitor (iem) OIDs (AP9618 or AP9619 Network Management Card Only)**
- **Measure-UPS (mUps) OIDs**



Note:

The external Environmental Monitor (em) OIDs expand on the management capabilities provided by the mUps OIDs. The mUps OIDs have been kept in the MIB for compatibility with previous versions of the PowerNet MIB.

External Environmental Monitor (em) OIDs

Three categories of em OIDs provide for managing external Environmental Monitors.

- **[emIdent] OID**
- **[emConfig] OIDs**
- **[emStatus] OIDs**

To access these em OIDs in the PowerNet MIB, do the following:

1. Select **[products]** under **[apc]**.
2. Select **[hardware]**.
3. Select **[environmentalMonitor]**.
4. Select **[external]**.

[emIdent] OID

A single **[emIdent]** OID, **emIdentFirmwareRevision**, identifies the firmware used by the Environmental Monitor.


[emConfig] OIDs

Two sets of [emConfig] OIDs are available to configure an external Environmental Monitor:

- [emConfigProbes] OIDs
- [emConfigContacts] OIDs

[emConfigProbes] OIDs

You use the following [emConfigProbes] OIDs to view and change values used by the temperature and humidity probes at an external Environmental Monitor.

OID	Task
emConfigProbesNumProbes	View how many probes are available (read-only).
{emConfigProbesTable} {emConfigProbesEntry} emConfigProbeNumber emConfigProbeName emConfigProbeHighTempThreshold emConfigProbeLowTempThreshold emConfigProbeTempUnits	Access the set of OIDs for each probe and perform the following: <ul style="list-style-type: none"> • View the number of the probe to which this set of OIDs applies (read-only). • Define a descriptive name for the probe. • Set the high-temperature threshold. • Set the low-temperature threshold. • View whether the probe uses Celsius (1) or Fahrenheit (2) temperature values (read-only). <div style="margin-left: 20px;">  <p><i>Note:</i> The temperature unit is defined by a system preferences setting at the agent.</p> </div>
emConfigProbeHighHumidThreshold emConfigProbeLowHumidThreshold	<ul style="list-style-type: none"> • Set the high-humidity threshold. • Set the low-humidity threshold.
emConfigProbeHighTempEnable emConfigProbeLowTempEnable emConfigProbeHighHumidEnable emConfigProbeLowHumidEnable	<ul style="list-style-type: none"> • Enable or disable the following alarms: <ul style="list-style-type: none"> - High-temperature threshold alarm - Low-temperature threshold alarm - High-humidity threshold alarm - Low-humidity threshold alarm

[emConfigContacts] OIDs

You use the following **[emConfigContacts]** OIDs to view and change values used by the input contacts at an external Environmental Monitor.

OID	Task
emConfigContactsNumContacts	View how many contacts are available (read-only).
{emConfigContactsTable} {emConfigContactsEntry} emConfigContactNumber emConfigContactName emConfigContactEnable	Access the set of OIDs for each input contact and perform the following: <ul style="list-style-type: none"> • Identify the contact to which this set of OIDs applies (read-only). • Define a descriptive name for the contact. • Enable or disable the contact alarm.

[emStatus] OIDs

Three types of **[emStatus]** read-only OIDs are available to view the status at an external Environmental Monitor:

- **[emStatusCommStatus] OID**
- **[emStatusProbes] OIDs**
- **[emStatusProbes] OIDs**


[emStatusCommStatus] OID

You use this read-only OID to view the status of the communication between the agent and the external Environmental Monitor.

Status	Description
noComm (1)	Communication has not been established.
comm (2)	Communication has been established.
commLost (3)	Communication was lost after it had been established.

[emStatusProbes] OIDs

You use the following [emStatusProbes] read-only OIDs to view information about the temperature and humidity probes at an external Environmental Monitor.

OID	Information Reported
emStatusProbesNumProbes	The number of available probes
{emStatusProbesTable} {emStatusProbesEntry} emStatusProbeNumber emStatusProbeName emStatusProbeStatus emStatusProbeCurrentTemp emStatusProbeTempUnits emStatusProbeCurrentHumid emStatusProbeHighTempViolation emStatusProbeLowTempViolation emStatusProbeHighHumidViolation emStatusProbeLowHumidViolation	Access the set of OIDs for each input contact and view the following information: <ul style="list-style-type: none"> • The number of the probe • The name of the probe • The disconnected (1) or connected (2) status of the probe • The current temperature reading at the probe • Whether Celsius (1) or Fahrenheit (2) temperature values are used by the probe <div style="text-align: center;">  <i>Note:</i> <i>The temperature unit is defined by a system preferences setting at the agent.</i> </div> <ul style="list-style-type: none"> • The current humidity reading at the probe • The noViolation (1), highTempViolation (2), or disabled (3) status of the high-temperature alarm • The noViolation (1), lowTempViolation (2), or disabled (3) status of the low-temperature alarm • The noViolation (1), highHumidViolation (2), or disabled (3) status of the high-humidity alarm • The noViolation (1), lowHumidViolation (2), or disabled (3) status of the low-humidity alarm

[emStatusContacts] OIDs

You use the following [emStatusContacts] read-only OIDs to view information about the input contacts at an external Environmental Monitor.

OID	Information Reported
emStatusContactsNumContacts	The number of available contacts
{emStatusContactsTable} {emStatusContactsEntry} emStatusContactNumber emStatusContactName emStatusContactStatus	Access the set of OIDs for each input contact and view the following information: <ul style="list-style-type: none"> • The number of the contact • The name of the contact • The noFault (1), fault (2), or disabled (3) status of the contact alarm

Integrated Environmental Monitor (iem) OIDs (AP9618 or AP9619 Network Management Card Only)

Three categories of iem OIDs provide for managing the Integrated Environmental Monitor at an AP9618 or AP9619 Network Management Card.

- **[iemIdent] OID**
- **[iemConfig] OIDs**
- **[iemStatus] OIDs**



Note:

The Integrated Environmental Monitor has one probe, two input contacts, and an output relay available.

To access these iem OIDs in the PowerNet MIB, do the following:

1. Select **[products]** under **[apc]**.
2. Select **[hardware]**.
3. Select **[environmentalMonitor]**.
4. Select **[integrated]**.

[iemIdent] OID

A single **[iemIdent]** OID, **iemIdentHardwareRevision**, identifies the hardware version for the Integrated Environmental Monitor.


[iemConfig] OIDs

Two sets of **[iemConfig]** OIDs are available to configure an Integrated Environmental Monitor:

- **[emConfigProbes] OIDs**
- **[emConfigContacts] OIDs**

[iemConfigProbes] OIDs

You use the following [iemConfigProbes] OIDs to view and change values used by the temperature and humidity probe at an Integrated Environmental Monitor.

OID	Task
iemConfigProbesNumProbes	View whether the single probe is available (read-only).
{iemConfigProbesTable} {iemConfigProbesEntry} iemConfigProbeNumber iemConfigProbeName iemConfigProbeHighTempThreshold iemConfigProbeLowTempThreshold iemConfigProbeTempUnits iemConfigProbeHighHumidThreshold iemConfigProbeLowHumidThreshold iemConfigProbeHighTempEnable iemConfigProbeLowTempEnable iemConfigProbeHighHumidEnable iemConfigProbeLowHumidEnable	Access the set of OIDs for the probe and perform the following: <ul style="list-style-type: none"> • View the number of the probe (read only). • Define a descriptive name for the probe. • Set the high-temperature threshold. • Set the low-temperature threshold. • View whether the probe uses Celsius (1) or Fahrenheit (2) temperature values (read-only).  <p><i>Note:</i> The temperature unit is defined by a system preferences setting at the agent.</p> <ul style="list-style-type: none"> • Set the high-humidity threshold. • Set the low-humidity threshold. • Enable or disable the following alarms: <ul style="list-style-type: none"> - High-temperature threshold alarm - Low-temperature threshold alarm - High-humidity threshold alarm - Low-humidity threshold alarm

[iemConfigContacts] OIDs

You use the following [iemConfigContacts] OIDs to view and change values used by the input contacts at an Integrated Environmental Monitor.

OID	Task
iemConfigContactsNumContacts	View how many contacts are available (read-only).
{iemConfigContactsTable} {iemConfigContactsEntry} iemConfigContactNumber iemConfigContactName iemConfigContactEnable	Access the set of OIDs for each input contact and perform the following: <ul style="list-style-type: none"> • Identify the contact to which this set of OIDs applies (read-only). • Define a descriptive name for the contact. • Enable or disable the contact alarm.


[iemStatus] OIDs

Three types of [iemStatus] read-only OIDs are available to view the status at an external Environmental Monitor:

- [iemStatusProbes] OIDs
- [iemStatusContacts] OIDs
- [iemStatusRelays] OIDs

[iemStatusProbes] OIDs

You use the following [iemStatusProbes] read-only OIDs to view information about the temperature and humidity probes at an Integrated Environmental Monitor.

OID	Information Reported
iemStatusProbesNumProbes	The number of available probes
{iemStatusProbesTable} {iemStatusProbesEntry} iemStatusProbeNumber iemStatusProbeName iemStatusProbeStatus iemStatusProbeCurrentTemp iemStatusProbeTempUnits iemStatusProbeCurrentHumid iemStatusProbeHighTempViolation iemStatusProbeLowTempViolation iemStatusProbeHighHumidViolation iemStatusProbeLowHumidViolation	Access the set of OIDs for each input contact and view the following information: <ul style="list-style-type: none"> • The number of the probe • The name of the probe • The disconnected (1) or connected (2) status of the probe • The current temperature reading at the probe • Whether Celsius (1) or Fahrenheit (2) temperature values are used by the probe  <p><i>Note:</i> The temperature unit used is defined by a system preferences setting at the agent.</p> <ul style="list-style-type: none"> • The current humidity reading at the probe • The noViolation (1), highTempViolation (2), or disabled (3) status of the high-temperature alarm • The noViolation (1), lowTempViolation (2), or disabled (3) status of the low-temperature alarm • The noViolation (1), highHumidViolation (2), or disabled (3) status of the high-humidity alarm • The noViolation (1), lowHumidViolation (2), or disabled (3) status of the low-humidity alarm

[iemStatusContacts] OIDs

You use the following [iemStatusContacts] read-only OIDs to view information about the input contacts at an Integrated Environmental Monitor.

OID	Information Reported
iemStatusContactsNumContacts	The number of available contacts
{iemStatusContactsTable} {iemStatusContactsEntry} iemStatusContactNumber iemStatusContactName iemStatusContactStatus	Access the set of OIDs for each input contact and view the following information: <ul style="list-style-type: none"> • The number of the contact • The name of the contact • The noFault (1), fault (2), or disabled (3) status

[iemStatusRelays] OIDs

You use the following [iemStatusRelays] read-only OIDs to view information about the output relay associated with the Integrated Environmental Monitor.

OID	Information Reported
iemStatusRelaysNumRelays	The number of available output relays
{iemStatusRelaysTable} {iemStatusRelaysEntry} iemStatusRelayNumber iemStatusRelayName iemStatusRelaytStatus	Access the set of OIDs for each output relay and view the following information: <ul style="list-style-type: none"> • The number of the output relay • The name of the output relay • The faultState (1) or normalState (2) status

Measure-UPS (mUps) OIDs

Two categories of mUps OIDs provide for managing external Environmental Monitors through a Management Card or PowerNet Agent that uses a previous version of the PowerNet MIB.

- **[mUpsEnviron] Environment OIDs**
- **[mUpsContact] Contact OIDS**

To access these mUps OIDs in the PowerNet MIB, do the following:

1. Select **[products]** under **[apc]**.
2. Select **[hardware]**.
3. Select **[measureUps]**.

[mUpsEnviron] Environment OIDs


An Environmental Monitor can monitor an environment's ambient temperature and relative humidity. You use two read-only [mUpsEnviron] OIDs to view those temperature and humidity values.

OID	Information Reported
mUpsEnvironAmbientTemperature	The ambient temperature, in Celsius or Fahrenheit, depending on the configuration, sensed by the Environmental Monitor.
mUpsEnvironRelativeHumidity	The relative humidity (as a percentage) sensed by the Environmental Monitor.

[mUpsContact] Contact OIDS

An Environmental Monitor or Measure-UPS can have up to four input contacts in use. Each sensor provides an open contact condition and a closed contact condition.

You use the following [mUpsContact] OIDs to view and change input contact values for a an Environmental Monitor or Measure-UPS. However, with an Environmental Monitor you cannot use an OID to set or view the normal status of the contacts.

OID	Task
mUpsContactNumContacts	Determine how many input contacts the Environmental Monitor or Measure-UPS is using.
{mUpsContactTable} {mUpsContactEntry} contactNumber normalState description monitoringStatus currentStatus	Access the set of OIDs for each input contact and perform the following: <ul style="list-style-type: none"> Identify the input contact to which this set of OIDs applies. Define the input contact's normal condition for a Measure-UPS: open (2) or closed (3).  <p>Caution: <i>An Environmental Monitor always report unknown (1) because the normal condition is not detectable via software.</i></p> <ul style="list-style-type: none"> Define a brief description of the input contact's purpose. Define whether the Measure-UPS will monitor the input contact. <ul style="list-style-type: none"> unknown (1): The monitoring status cannot be determined. enabled (2): The input contact will be monitored. disabled (3): The input contact will not be monitored. Identify the current condition of the input contact: unknown (1), noFault (2) or fault (3).

Chapter 5: How to Manage a MasterSwitch Unit

This chapter describes how to use PowerNet MIB OIDs to manage a MasterSwitch unit, MasterSwitch VM unit, or MasterSwitch Plus unit. For information on how to manage the Agent that these units use, see **How to Manage the SNMP Agent at a Hardware Device in Chapter 2**.

To list the five OID categories that you use to manage a MasterSwitch unit, perform the following steps:

1. Select **[products]** under **[apc]**.
2. Select **[hardware]**.
3. Select **[masterswitch]**.

OID Categories	Tasks
[sPDUIdent]	Identify the MasterSwitch unit by its identification parameter values. See [sPDUIdent] Identification OIDs .
[sPDUMasterControl]	Directly affect the overall operation of the MasterSwitch unit. See [sPDUMasterControl] Master Control OIDs .
[sPDUMasterConfig]	Modify parameters that affect the overall operation of the MasterSwitch unit. See [sPDUMasterConfig] Master Configuration OIDs .
[sPDUOutletControl]	Directly affect the current operation of an outlet at a MasterSwitch unit. See [sPDUOutletControl] Outlet Control OIDs .
[sPDUOutletConfig]	Modify parameters that affect the operation of an outlet at a MasterSwitch unit. See [sPDUOutletConfig] Outlet Configuration OIDs .

[sPDUIdent] Identification OIDS

The [sPDUIdent] category has five read-only OIDs that report MasterSwitch unit identification parameter values.




Note:

MasterSwitch unit version 2.x identification parameters reflect the values of the Web/SNMP Management Card (AP9606)

OID	Information Reported
sPDUIdentHardwareRev	The MasterSwitch unit's hardware version
sPDUIdentFirmwareRev	The MasterSwitch unit's firmware version
sPDUIdentDateOfManufacture	The date on which the MasterSwitch unit completed the manufacturing process, in <i>mm/dd/yyyy</i> format
sPDUIdentModelNumber	The MasterSwitch unit's model number
sPDUIdentSerialNumber	The MasterSwitch unit's serial number



[sPDUMasterControl] Master Control OIDs

The [sPDUMasterControl] category has two OIDs that respond to **GETs** with information about all eight outlets and a third OID that uses **SETs** to directly affect the operation of all outlets simultaneously.

OID	Task
sPDUMasterControlSwitch	<p>Affect the operation of all outlets.</p> <ul style="list-style-type: none"> • turnAllOnNow (1): Immediately turn on all outlets. • turnAllOnSequence (2): Turn on all outlets by using the sPDUOutletPowerOnTime OID value for each outlet. • turnAllOffNow (3): Immediately turn off all outlets. • rebootAllNow (4): Immediately reboot all outlets by turning off power and then turning on power based on the master power's sPDUMasterConfigReboot configuration OID value. • rebootAllSequence (5): <ul style="list-style-type: none"> - For firmware version 2.x: Turn off all outlets as described for turnAllOffSequence, wait the delay time specified as sPDUMasterConfigReboot, and then turn on all outlets as described for turnAllOnSequence. - For firmware version 1.x: Reboot all outlets as described for turnAllOnSequence. • noCommand (6): The value returned for a GET. • turnAllOffSequence (7): Turn off all outlets by using each outlet's sPDUOutletPowerOffTime configuration OID value. <p> <i>Note: The turnAllOffSequence (7) setting has no effect when used with firmware version 1.x.</i></p>
sPDUMasterState	Identify the on or off status of the eight outlets.
sPDUMasterPending	Identify whether any outlet has a command pending (yes or no).
<p>For information on [sPDUMasterConfigReboot] and [sPDUMasterConfigPowerOn], see [sPDUMasterConfig] Master Configuration OIDs; for information on [sPDUMasterConfigReboot] and [sPDUOutletPowerOnTime] OIDs, see [sPDUOutletConfig] Outlet Configuration OIDs.</p>	

[sPDUMasterConfig] Master Configuration OIDs

The [sPDUMasterConfig] category has three OIDs that allow you to use SETs to define two overall operational values and a name for the MasterSwitch unit. If the MasterSwitch unit uses firmware version 2.x, the sPDUMasterConfigReboot OID is read-only.

OID	Task
sPDUMasterConfigPowerOn	<p>Define how long a delay will occur after power is applied to the MasterSwitch unit until it supplies power to the outlets.</p> <ul style="list-style-type: none"> • -1: Never apply power automatically; you must turn on outlets manually. • 0: Apply power immediately, with no delay. • 15: 15-second delay. • 30: 30-second delay. • 45: 45-second delay. • 60: 1-minute delay. • 120: 2-minute delay. • 300: 5-minute delay. <p> <i>Note:</i> Each outlet's sPDUOutletConfigPowerOn Time configuration OID also affects the time it takes for an outlet to provide power. See [sPDUOutletConfig] Outlet Configuration OIDs.</p>
sPDUMasterConfigReboot	<p>Define how long a delay after master power is turned off during a reboot sequence until master power is turned on again. This OID checks the delay that is set for each outlet and reports the longest of these delays. This OID is read-only for firmware version 2.x.</p> <ul style="list-style-type: none"> • 5: 5-second delay. • 10: 10-second delay. • 15: 15-second delay. • 20: 20-second delay. • 30: 30-second delay. • 45: 45-second delay. • 60: 1-minute delay. <p> <i>Note:</i> Each outlet's sPDUOutletConfigPowerOnTime configuration OID also affects the time it takes for an outlet to provide power. See [sPDUOutletConfig] Outlet Configuration OIDs.</p>
sPDUMasterConfigPDUName	Define a name (of up to 20 characters) for the MasterSwitch unit.

[sPDUOutletControl] Outlet Control OIDs

The [sPDUOutletControl] category has a read-only OID and a tabled set of OIDs.

OID	Task
<code>sPDUOutletControlTableSize</code>	Identify the number of MasterSwitch unit outlets (always 8)
{sPDUOutletControlTable} {sPDUOutletControlEntry} sPDUOutletControlIndex sPDUOutletPending sPDUOutletCtl sPDUOutletCtlName	<p>View and control each outlet individually:</p> <ul style="list-style-type: none"> • The outlet number (read-only). • Identify whether the outlet has a command pending: <ul style="list-style-type: none"> - commandPending (1): A command is pending. - noCommandPending (2): There is no pending command. - commandPendingUnknown (3): This is an error condition. To clear the condition, shut down all devices powered by the MasterSwitch unit, and turn power off and then on to the MasterSwitch unit. • Affect the outlet's current operation. <ul style="list-style-type: none"> - outletOn (1): Turn on the outlet's power. - outletOff (2): Turn off the outlet's power. - outletReboot (3): Turn off and then turn on the outlet's power. - outletUnknown (4): This is an error condition. Shut down all devices powered by the MasterSwitch unit, then turn power off and on to the MasterSwitch unit to clear the condition. - outletOnWithDelay (5): Not valid for firmware version 1.x. Turn on the outlet's power after the delay specified as <code>sPDUOutletPowerOnTime</code>. - outletOffWithDelay (6): Not valid for firmware version 1.x. Turn off the outlet's power after the delay specified as <code>sPDUOutletPowerOffTime</code>. - outletRebootWithDelay (7): Not valid for firmware version 1.x. After the delay specified as <code>sPDUOutletPowerOffTime</code>, turn off the outlet's power, wait the time specified as <code>sPDUOutletRebootDuration</code>, and turn on the outlet's power. • Identify the outlet's name (20 characters or less) as defined by <code>sPDUOutletName</code>. See [sPDUOutletConfig] Outlet Configuration OIDs.

[sPDUOutletConfig] Outlet Configuration OIDs

The [sPDUOutletConfig] category has a read-only OID and a tabled set of OIDs.

OID	Task
sPDUOutletConfigTableSize	Identify the number of MasterSwitch unit outlets (always 8).
{sPDUOutletConfigTable} {sPDUOutletConfigEntry} sPDUOutletConfigIndex sPDUOutletPowerOnTime sPDUOutletName sPDUOutletPowerOffTime sPDUOutletRebootDuration	<p>View and configure each outlet individually.</p> <ul style="list-style-type: none"> • The outlet number (read-only). • Define how long the outlet will wait to provide output power after the MasterSwitch unit is turned on. <ul style="list-style-type: none"> - -1: Never start providing output power automatically. - 0: Begin providing output power immediately. - 15: 15-second delay - 30: 30-second delay - 45: 45-second delay - 60: 1-minute delay - 120: 2-minute delay - 300: 5-minute delay • Define a name of up to 20 characters for the outlet. • Not valid for Firmware version 1.x. Define the time that the outlet will wait after being commanded to turn off its output power until it does turn off its output power <ul style="list-style-type: none"> - -1: Never stop providing output power automatically - 0: Stop providing output power immediately. - 15: 15-second delay - 30: 30-second delay - 45: 45-second delay - 60: 1-minute delay - 120: 2-minute delay - 300: 5-minute delay • Not valid for Firmware version 1.x. Define how long a delay will occur after power is turned off during a reboot sequence until power is turned on again. <ul style="list-style-type: none"> - 5: 5-second delay - 10: 10-second delay - 15: 15-second delay - 20: 20-second delay - 30: 30-second delay - 45: 45-second delay - 60: 1-minute delay

Chapter 6: How to Manage a MasterSwitch VM Unit

This chapter describes how to use PowerNet MIB OIDs to manage (monitor, configure, control and test) a MasterSwitch VM unit.

The MasterSwitch VM unit has its own SNMP agent that allows you to use SNMP to manage the MasterSwitch VM unit or any of its eight relay-controlled outlets. A maximum of four MasterSwitch VM units can be connected in a daisy chain and managed via SNMP. For more information on how to manage the SNMP agent, see **How to Manage the SNMP Agent at a Hardware Device in Chapter 2**.

To list the seven categories of PowerNet MIB OIDs that you use to manage a MasterSwitch VM unit, perform the following steps:

1. Select [\[products\]](#) under [\[apc\]](#).
2. Select [\[hardware\]](#).
3. Select [\[masterSwitchVM\]](#).

OID Categories	Tasks
[sPDUIdentVM]	Identify the MasterSwitch VM unit by its identification parameter values. See [sPDUIdentVM] Identification OIDs .
[sPDUMasterControlVM]	Directly affect the overall operation of the MasterSwitch VM unit. See [sPDUMasterControlVM] Master Control OIDs .
[sPDUMasterConfigVM]	Modify parameters that affect the overall operation of the MasterSwitch VM unit. See [sPDUMasterConfigVM] Master Configuration OIDs .
[sPDUMasterStatusVM]	Identify the status of MasterSwitch VM unit. See [sPDUMasterStatusVM] Master Status OIDs .
[sPDUOutletControlVM]	Directly affect the operation of an outlet at a MasterSwitch VM unit. See [sPDUOutletControlVM] Outlet Control OIDs .
[sPDUOutletConfigVM]	Modify parameters that affect the operation of an outlet at a MasterSwitch VM unit. See [sPDUOutletConfigVM] Outlet Configuration OIDs .
[sPDUOutletStatusVM]	Identify the status of the outlets of the MasterSwitch VM unit. See [sPDUOutletStatusVM] Outlet Status OIDs .

[sPDUIdentVM] Identification OIDs

The [sPDUIdentVM] category has a read-only OID and a tabled set of read-only OIDs that return values for MasterSwitch VM unit's identification parameters.



Note:

The last five OIDs in the following table are set at the factory.

OID	Information Reported
sPDUIdentVMTableSize	The number of MasterSwitch VM units.
{sPDUIdentVMTable} {sPDUIdentVMEntry} sPDUIdentVMIndex sPDUIdentNameVM sPDUIdentHardwareRevVM sPDUIdentFirmwareRevVM sPDUIdentDateofManufactureVM sPDUIdentModelNumberVM sPDUIdentSerialNumberVM	View the following information about a specified MasterSwitch VM unit. <ul style="list-style-type: none"> • The index to the MasterSwitch VM unit's entry. • The name of the MasterSwitch VM unit. (You use the sPDUIdentVMName OID to define this name.) • The MasterSwitch VM unit's hardware version. • The MasterSwitch VM unit's firmware version. • The date on which the MasterSwitch VM unit completed the manufacturing process, in <i>mm/dd/yyyy</i> format. • The MasterSwitch VM unit's model number. • The MasterSwitch VM unit's serial number.

[sPDUMasterControlVM] Master Control OIDs

The [sPDUMasterControlVM] category has a read-only OID and a tabled set of OIDs that provide information on the MasterSwitch VM unit and commands to control it.

OID	Task
sPDUMasterControlVMTableSize	The number of MasterSwitch VM units.
{sPDUMasterControlVMTable} {sPDUMasterControlVMEntry} sPDUMasterControlVMIndex sPDUMasterControlVMName sPDUMasterControlVMCommand	View and control a specified MasterSwitch VM unit. <ul style="list-style-type: none"> • The index to the MasterSwitch VM unit's entry (read-only). • The name for the MasterSwitch VM unit (read-only). (You use the sPDUMasterConfigVMName OID to define this name.) • Affect the current outlet state. <ul style="list-style-type: none"> - noCommandAllVM (1): The value returned by an SNMP GET of this OID. - immediateAllOnVM (2): Turn on all outlets immediately. - immediateAllOffVM (3): Turn off all outlets immediately. - immediateAllRebootVM (4): Reboot all outlets immediately. - delayedAllOnVM (5): Turn on all outlets as defined by the value of the sPDUOutletConfigVMPowerOnTime OID for each outlet. - delayedAllOffVM (6): Turn off all outlets as defined by the value of the sPDUOutletConfigVMPowerOffTime OID for each outlet. - sequencedAllRebootVM (7): Perform the command immediateAllOffVM, wait the time specified for the sPDUMasterStatusVMRebootDuration OID, then perform the command delayedAllOnVM. - delayedAllRebootVM (8): Perform the command immediateAllOffVM, then cause each outlet to wait the time specified by its sPDUOutletConfigVMRebootDuration OID before it provides power. - delayedSequenceAllRebootVM (9): Perform the command delayedAllOffVM; when all outlets are off, wait the time specified by the sPDUMasterStatusVMRebootDuration OID, then perform the command delayedAllOnVM. - cancelAllPendingCommandsVM (10): Cancel all pending commands on the MasterSwitch VM unit. - audioAlarmMute (11): Disable the audible alarm for the duration of the current overload condition. The alarm will be activated for subsequent overload alarm conditions.

[sPDUMasterConfigVM] Master Configuration OIDs

The [sPDUMasterConfigVM] category has a read-only OID and a tabled set of OIDs that provide commands to configure the MasterSwitch VM unit.

OID	Task
sPDUMasterConfigVMTableSize	The number of MasterSwitch VM units.
<p>{sPDUMasterConfigVMTable} {sPDUMasterConfigVMEntry}</p> <p>sPDUMasterConfigVMIndex sPDUMasterConfigVMName</p> <p>sPDUMasterConfigVMColdstartDelay</p> <p>sPDUMasterConfigVMAudioAlarmActivated</p> <p>sPDUMasterConfigVMHighLoadWarningThreshold</p> <p>sPDUMasterConfigVMLowLoadWarningThreshold</p> <p>sPDUMasterConfigVMOverloadRestriction</p>	<p>View and configure a specified MasterSwitch VM unit.</p> <ul style="list-style-type: none"> • The index to the MasterSwitch VM unit's entry (read-only). • Define a name (up to 23 characters) for the MasterSwitch VM unit. • Define the delay that will occur from the time that power is applied to the MasterSwitch VM unit until it supplies power to its outlets: <ul style="list-style-type: none"> - -1: Never start providing output power automatically. - 0: Begin providing output power immediately. - 15: 15-second delay - 20: 20-second delay - 30: 30-second delay - 45: 45-second delay - 60: 1-minute delay - 120: 2-minute delay - 300: 5-minute delay • Define the following by using a SET: <ul style="list-style-type: none"> - audioAlarmActiveNever (1): Disable the audio alarm. - audioAlarmActiveOnOverload (2): Cause the audio alarm to sound when an overload condition occurs. - audioAlarmActiveOnOverloadImminent (3): Cause the audio alarm to sound when the load on the MasterSwitch VM unit exceeds the high load warning threshold, as defined by the sPDUMasterConfigVMHighLoadWarningThreshold OID. • Define the threshold that indicates when the power consumption of the load is approaching an overload condition. The value is specified as a percentage of a full load. • Define the threshold that indicates when the power consumption of the load is approaching a low-consumption condition. The value is specified as a percentage of a full load. • Control the behavior of the MasterSwitch VM unit when an overload condition is imminent and a request has been made to turn on additional outlets. <ul style="list-style-type: none"> - alwaysAllowTurnOn (1): Always allow the outlets to turn on. - restrictOnWarning (2): Do not allow outlets to turn on if the OID value specified for the High Load Warning Threshold is exceeded. - restrictOnOverload (3): Do not allow outlets to turn on if the MasterSwitch VM unit is in an overload condition

[sPDUMasterStatusVM] Master Status OIDs

The [sPDUMasterStatusVM] category has a read-only OID and a tabled set of read-only OIDs that provide information on the status of the MasterSwitch VM unit.

OID	Information Reported
sPDUMasterStatusVMTableSize	The number of MasterSwitch VM units.
{sPDUMasterStatusVMTable} {sPDUMasterStatusVMEntry} sPDUMasterStatusVMIndex sPDUMasterStatusVMName sPDUMasterStatusVMCommandPending sPDUMasterStatusVMOverloadCondition sPDUMasterStatusVMLowLoadCondition sPDUMasterStatusVMCurrentLoad sPDUMasterStatusVMMaxLoad sPDUMasterStatusVMOutletCount sPDUMasterStatusVMRebootDuration	Information about the status of a specified MasterSwitch VM unit. <ul style="list-style-type: none"> • The index to the MasterSwitch VM unit's entry (read-only). • The name of the MasterSwitch VM unit (read-only). (You use the sPDUMasterConfigVMName OID to define this name.) • One of the following: <ul style="list-style-type: none"> - commandPendingMasterTrueVM (1) if the MasterSwitch VM unit has a pending command on any of its outlets. - commandPendingMasterFalseVM (2) if there are no pending commands. • One of the following: <ul style="list-style-type: none"> - overloadConditionTrueVM (1) if the sPDUMasterConfigVMHighLoadWarningThreshold OID is violated. - overloadConditionFalseVM (2) if the sPDUMasterConfigVMHighLoadWarningThreshold OID is not violated. • One of the following: <ul style="list-style-type: none"> - lowLoadConditionTrueVM (1) if the sPDUMasterConfigVMLowLoadWarningThreshold OID is violated. - lowLoadConditionFalseVM (2) if the sPDUMasterConfigVMLowLoadWarningThreshold OID is not violated. • The total power being used by the attached equipment as a percentage of full load. • The total power, in Amperes, that the MasterSwitch VM unit can provide. • The number of controllable outlets for the MasterSwitch VM unit. • The largest sPDUOutletConfigVMRebootDuration OID time for the MasterSwitch VM unit

[sPDUOutletControlVM] Outlet Control OIDs

The [sPDUOutletControlVM] category has a tabled set of OIDs that provide information on MasterSwitch VM unit's outlets and provide commands to control individual outlets.

OID	Task
<p>{sPDUOutletControlVMTable} {sPDUOutletControlVMEntry}</p> <p>sPDUOutletControlVMIndex sPDUOutletControlVMName</p> <p>sPDUOutletControlVMOutletIndex sPDUOutletControlVMOutletName</p> <p>sPDUOutletControlVMOutletCommand</p>	<p>Control a specified outlet. (The sPDUOutletControlVMTable OID identifies the number of table entries.)</p> <ul style="list-style-type: none"> • The index to the MasterSwitch VM unit's entry (read-only). • The name of the MasterSwitch VM unit (read-only). (You use the sPDUOutletControlVMName OID to define this name.) • The outlet number (read-only). • The name of the outlet (read-only). (You use the sPDUOutletControlVMOutletName OID to define this name.) <p>Obtain the outlet state by using a GET:</p> <ul style="list-style-type: none"> - immediateOnVM (1) if the outlet is on. - immediateOffVM (2) if the outlet is off. <p>Perform any of the following by using a GET.</p> <ul style="list-style-type: none"> - immediateOnVM (1): Immediately turn on outlet. - immediateOffVM (2): Immediately turn off the outlet. - immediateRebootVM (3): immediately reboot the outlet. - delayedOnVM (4): Turn on the outlet after the time specified by the sPDUOutletControlVMPowerOnTime OID. - delayedOffVM (5): Turn off the outlet after the time specified by the sPDUOutletControlVMPowerOffTime OID. - delayedRebootVM (6): Perform the command delayedOffVM, wait the time specified by the sPDUOutletControlVMRebootDuration OID, and then perform the command immediateOnVM. - cancelPendingCommandVM (7): Cancel any pending command to the outlet.

[sPDUOutletStatusVM] Outlet Status OIDs

The [sPDUOutletStatusVM] category has a tabled set of OIDs that provide information on the status of the outlets for a MasterSwitch VM unit.

OID	Information Provided
<p>{sPDUOutletStatusVMTable} {sPDUOutletStatusVMEntry}</p> <p>sPDUOutletStatusVMIndex sPDUOutletStatusVMName</p> <p>sPDUOutletStatusVMOutletIndex sPDUOutletStatusVMOutletName</p> <p>sPDUOutletStatusVMOutletState</p> <p>sPDUOutletStatusVMCommandPending</p>	<p>View the status of a specified outlet. (The sPDUOutletStatusVMOutletCount OID identifies the number of table entries.)</p> <ul style="list-style-type: none"> • Index to the MasterSwitch VM unit's entry (read only). • The name of the MasterSwitch VM unit (read-only). (You use the sPDUOutletStatusVMName OID to define this name.) • The outlet number (read only). • The name of the outlet (read-only). (You use the sPDUOutletStatusVMOutletName OID to define this name.) • One of the following: <ul style="list-style-type: none"> - outletStatusOnVM (1) if the outlet is on - outletStatusOffVM (2) if the outlet is off • One of the following: <ul style="list-style-type: none"> - outletStatusVMCommandPending (1) if a command is pending on the outlet. - outletStatusVMNoCommandPending (2) if no command is pending on the outlet.

Chapter 7: How to Manage a MasterSwitch Plus Unit

This chapter describes how to use PowerNet MIB OIDs to manage (monitor, configure, control and test) a MasterSwitch Plus unit. The MasterSwitch Plus unit has its own SNMP agent that allows you to use SNMP to manage the MasterSwitch Plus unit or any of its eight relay-controlled outlets. A maximum of four MasterSwitch Plus units can be connected in a daisy chain and managed via SNMP. For more information on how to manage the SNMP agent, see **How to Manage the SNMP Agent at a Hardware Device in Chapter 2**.

To list the seven categories of PowerNet MIB OIDs that you use to manage a MasterSwitch Plus unit, perform the following steps:

1. Select **[products]** under **[apc]**.
2. Select **[hardware]**.
3. Select **[masterSwitchMSP]**.

OID Categories	Tasks
[sPDUIdentMSP]	Identify the MasterSwitch Plus unit by its identification parameter values. See [sPDUIdentMSP] Identification OIDs .
[sPDUMasterControlMSP]	Directly affect the overall operation of the MasterSwitch Plus unit. See [sPDUMasterControlMSP] Master Control OIDs .
[sPDUMasterConfigMSP]	Modify parameters that affect the overall operation of the MasterSwitch Plus unit. See [sPDUMasterConfigMSP] Master Configuration OIDs .
[sPDUMasterStatusMSP]	View the status of MasterSwitch Plus unit. See [sPDUMasterStatusMSP] Master Status OIDs .
[sPDUOutletControlMSP]	Directly affect the operation of an outlet at a MasterSwitch Plus unit. See [sPDUOutletControlMSP] Outlet Control OIDs .
[sPDUOutletConfigMSPall]	Modify parameters that affect how an outlet at a MasterSwitch Plus unit operates. See [sPDUOutletConfigMSPall] Outlet Configuration OIDs .
[sPDUOutConfigMSPgs]	Configure individual outlets in relation to Graceful Shutdown mode. See [sPDUOutConfigMSPgs] Outlet Configuration OIDs .
[sPDUOutletConfigMSPannun]	Configure individual outlets in relation to Annunciator mode. See [sPDUOutConfigMSPannun] Outlet Configuration OIDs .
[sPDUOutletConfigMSPmups]	Configure individual outlets to turn off in response to the state of the alarm conditions of the Environmental Monitor or to ignore those alarm conditions. See [sPDUOutConfigMSPmups] Outlet Configuration OIDs .
[sPDUOutletStatusMSP]	View the status of the outlets of the MasterSwitch Plus unit. See [sPDUOutletStatusMSP] Outlet Status OIDs .

[sPDUIdentMSP] Identification OIDs

The [sPDUIdentMSP] category has a read-only OID and a tabled set of read-only OIDs that return values for MasterSwitch Plus unit identification parameters.



Note:

The last five OIDs in the following table are set at the factory.

OID	Information Reported
sPDUIdentMSPTableSize	The number of MasterSwitch Plus units.
{sPDUIdentMSPTable} {sPDUIdentMSPEntry} sPDUIdentMSPIndex sPDUIdentNameMSP sPDUIdentHardwareRevMSP sPDUIdentFirmwareRevMSP sPDUIdentDateOfManufactureMSP sPDUIdentModelNumberMSP sPDUIdentSerialNumberMSP	View the following information about a specified MasterSwitch Plus unit. <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry. • The name of the MasterSwitch Plus unit (read only) (You use the sPDUMasterConfigMSPName OID to define this name). • The MasterSwitch Plus unit's hardware version. • The MasterSwitch Plus unit's firmware version. • The date on which the MasterSwitch Plus unit completed the manufacturing process, in <i>mm/dd/yyyy</i> format. • The MasterSwitch Plus unit's model number. • The MasterSwitch Plus unit's serial number.

[sPDUMasterControlMSP] Master Control OIDs

The [sPDUMasterControlMSP] category has a read-only OID and a tabled set of OIDs that provide information on the MasterSwitch Plus unit and commands to control it.

OID	Task
sPDUMasterControlMSPTableSize	The number of MasterSwitch Plus units.
{sPDUMasterControlMSPTable} {sPDUMasterControlMSPEntry} sPDUMasterControlMSPIndex sPDUMasterControlMSPName sPDUMasterControlMSPCommand	View and control a specified MasterSwitch Plus unit. <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry (read only). • The name of the MasterSwitch Plus unit (read only) (You use the sPDUMasterConfigMSPName OID to define this name). • Affect the current outlet state. <ul style="list-style-type: none"> - noCommandAllMSP (1): The value returned by an SNMP GET of this OID. - immediateAllOnMSP (2): Turn on all outlets immediately. - sequencedAllOnMSP (3): Turn on all outlets as defined by the sPDUOutletConfigMSPgsPowerOnDelay OID for each outlet. - immediateAllOffMSP (4): Turn off all outlets immediately. - gracefulAllRebootMSP (5): After the device running PowerChute <i>plus</i> confirms shutdown, reboot all outlets as defined by the time value of the sPDUOutletConfigMSPgsRebootDuration OID for each outlet. - immediateAllRebootMSP (6): Reboot all outlets immediately. - gracefulAllShutdownMSP (7): After the device running PowerChute <i>plus</i> confirms shutdown, shut down all outlets as defined by the time value of the sPDUOutletConfigMSPgsPowerOffDelay OID for each outlet. Turn each outlet back on after waiting for two consecutive delay periods: <ul style="list-style-type: none"> • The time defined by the value of the OID sPDUOutletConfigMSPgsRestartDelay for the outlet • The time defined by the value of the OID sPDUOutletConfigMSPgsPowerOnDelay for the outlet. - overrideAllBatCapThreshMSP (8): Ignore the battery capacity threshold, and turn on each outlet after the delay defined by the sPDUOutletConfigMSPgsPowerOnDelay OID for that outlet. - cancelAllPendingCommandsMSP (9): Cancel all pending commands on the MasterSwitch Plus unit. - restoreFactoryDefaultsMSP (10): Reset the settings for the MasterSwitch Plus unit to the defaults originally set at the factory.

[sPDUMasterConfigMSP] Master Configuration OIDs

The [sPDUMasterConfigMSP] category has a read-only OID and a tabled set of OIDs that provide commands to configure the MasterSwitch Plus unit.

OID	Task
sPDUMasterConfigMSPTableSize	The number of MasterSwitch Plus units.
{sPDUMasterConfigMSPTable} {sPDUMasterConfigMSPEntry} sPDUMasterConfigMSPIndex sPDUMasterConfigMSPName sPDUMasterConfigMSPPowerOnTimeDelay sPDUMasterConfigMSPManualButton	View and configure a specified MasterSwitch Plus unit. <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry (read-only). • Define a name (up to 23 characters) for the MasterSwitch Plus unit. • Define the delay that will occur from the time that power is applied to the MasterSwitch Plus unit until the it supplies basic master power to its outlets: <ul style="list-style-type: none"> - 0: Begin providing output power immediately. - 1 through 9999 seconds (2 hours, 46 minutes, 39 seconds): Provide output power after the specified delay. • Disable (manualButtonDisabled (1)) or enable manualButtonEnabled (2) the manual button on the MasterSwitch Plus unit.

[sPDUMasterStatusMSP] Master Status OIDs

The [sPDUMasterStatusMSP] category has one read-only OID and a tabled set of read-only OIDs that provide information on the status of the MasterSwitch Plus unit.

OID	Information Reported
sPDUMasterStatusMSPTableSize	The number of MasterSwitch Plus units.
{sPDUMasterStatusMSPTable} {sPDUMasterStatusMSPEntry} sPDUMasterStatusMSPIndex sPDUMasterStatusMSPName sPDUMasterStatusMSPOutletCount	View identification information about a specified MasterSwitch Plus unit. <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry (read only). • The name of the MasterSwitch Plus unit (read only) (You use the sPDUMasterConfigMSPName OID to define this name). • The number of MasterSwitch Plus outlets.

[sPDUOutletControlMSP] Outlet Control OIDs

The [sPDUOutletControlMSP] category has a tabled set of OIDs that provide information on the outlets at a MasterSwitch Plus unit and provide commands to control individual outlets.

OID	Task
<p>{sPDUOutletControlMSPTable} {sPDUOutletControlMSPEntry}</p> <p>sPDUOutletControlMSPIndex sPDUOutletControlMSPName</p> <p>sPDUOutletControlMSPOutletIndex sPDUOutletControlMSPOutletName</p> <p>sPDUOutletControlMSPOutletCommand</p>	<p>Control a specified outlet. (The sPDUOutletControlMSPTable OID identifies the number of table entries.)</p> <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry (read only). • The name of the MasterSwitch Plus unit (read only) (You use the sPDUOutletControlMSPName OID to define this name). • The outlet number (read only). • The name of the MasterSwitch Plus unit (read only) (You use the sPDUOutletControlMSPOutletName OID to define this name). <p>• Use a GET to obtain the outlet state.</p> <ul style="list-style-type: none"> - immediateOnMSP (1) if the outlet is on. - immediateOffMSP (3) if the outlet is off. <p>Use a SET to perform any of the following.</p> <ul style="list-style-type: none"> - immediateOnMSP (1): Immediately turn on the outlet. - delayedOnMSP (2): Turn on the outlet after the time specified by the sPDUOutletConfigMSPgsPowerOnDelay OID. - immediateOffMSP (3): Immediately turn off the outlet. - gracefulRebootMSP (4): Cause the outlet to wait for device confirmation (if applicable), then turn off after the time specified by the sPDUOutletConfigMSPgsPowerOffDelay OID, and then turn on after the time specified by the sPDUOutletConfigMSPgsRebootDuration OID - immediateRebootMSP (5): Immediately reboot the outlet. - gracefulShutdownMSP (6): Cause the outlet to wait for device confirmation (if applicable), then turn off after the time specified by the sPDUOutletConfigMSPgsPowerOffDelay OID. The outlet will turn on again after waiting both the time specified by the sPDUOutletConfigMSPgsRestartDelay OID and the time specified by the sPDUOutletConfigMSPgsPowerOnDelay OID - overrideBatCapThreshMSP (7): Cause the outlet to ignore the battery capacity threshold and turn on after the time specified by the sPDUOutletConfigMSPgsPowerOnDelay OID. - cancelPendingCommandMSP (8): Cancel any pending command on the outlet.

[sPDUOutletConfigMSPall] Outlet Configuration OIDs

The [sPDUOutletConfigMSPall] category contains a tabled set of OIDs that provide information on the outlets at a MasterSwitch Plus unit and allow you to configure values for individual outlets.

OID	Task
{sPDUOutletConfigMSPallTable} {sPDUOutletConfigMSPallEntry} sPDUOutletConfigMSPallIndex sPDUOutletConfigMSPallName sPDUOutletConfigMSPallOutletIndex sPDUOutletConfigMSPallOutletName sPDUOutletConfigMSPallOutletCtrlMode	Configure individual MasterSwitch Plus outlets. (The sPDUOutletStatusMSPOutletCount OID identifies the number of table entries.) <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry (read only). • The name of the MasterSwitch Plus unit (read only) (You use the sPDUOutletConfigMSPName OID to define this name). • The outlet number (read only) • Define the name (up to 23 characters) of the outlet. • Use a SET to do one of the following: <ul style="list-style-type: none"> - modeGracefulShutdown (1): Put this outlet into Graceful Shutdown control mode. See [sPDUOutletConfigMSPgs] Outlet Configuration OIDs for options you can set for this mode. - modeAnnunciator (2): Put this outlet in Annunciator control mode.

[sPDUOutletConfigMSPgs] Outlet Configuration OIDs

The [sPDUOutletConfigMSPgs] category has a tabled set of OIDs that provide commands to configure individual outlets in relation to Graceful Shutdown mode.

OID	Task
<p>{sPDUOutletConfigMSPgsTable} {sPDUOutletConfigMSPgsEntry}</p> <p>sPDUOutletConfigMSPgsIndex sPDUOutletConfigMSPgsName</p> <p>sPDUOutletConfigMSPgsOutletIndex sPDUOutletConfigMSPgsOutletName</p> <p>sPDUOutletConfigMSPgsOutletCtrlMode</p> <p>sPDUOutletConfigMSPgsDeviceConfirm</p> <p>sPDUOutletConfigMSPgsLowBattWarning</p> <p>sPDUOutletConfigMSPgsLowBattMult</p> <p>sPDUOutletConfigMSPgsRestartDelay</p> <p>sPDUOutletConfigMSPgsPowerOnDelay</p> <p>sPDUOutletConfigMSPgsPowerOffDelay</p> <p>sPDUOutletConfigMSPgsBattCapThresh</p> <p>sPDUOutletConfigMSPgsRebootDuration</p>	<p>View and configure a specified outlet for Graceful Shutdown mode. (The OID sPDUOutletConfigMSPgsTable identifies the number of table entries.)</p> <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit’s entry (read only). • The name of the MasterSwitch Plus unit (read only). (You use the sPDUOutletConfigMSPgsName OID to define this name). • The outlet number (read only) • The name of the outlet (read only). (You use the sPDUOutletConfigMSPgsOutletName OID to define this name). • The control mode of the outlet, as defined by the sPDUOutletConfigMSPgsOutletCtrlMode OID: <ul style="list-style-type: none"> - modeGracefulShutdown: (1): In Graceful Shutdown Control Mode. - modeAnnunciator (2): In Annunciator Mode. • Define whether the outlet waits for shutdown confirmation before turning off. <ul style="list-style-type: none"> - deviceConfirmNo (1): Do not wait for confirmation. - deviceConfirmYes (2): Wait for confirmation. • Define how long this outlet will wait before beginning its turn-off sequence after the UPS switches to battery operation. <ul style="list-style-type: none"> - -2: Do not turn off the outlet. - -1: Begin the turn-off sequence based on remaining runtime. - 0: Begin the turn-off sequence at low battery warning. - 1 to 9999 intervals of 6 seconds each. Begin the turn-off sequence after the specified number of intervals (e.g. 5994 = 1 hour, 39 minutes, 54 seconds). • Define a multiplier value for this outlet that enables “load shedding,” i.e. as UPS battery runtime decreases, outlets turn off in stages, so that power is maintained to your most important equipment for as long as possible. <ul style="list-style-type: none"> - 1 to 7: Unless the sPDUOutletConfigMSPgsLowBattWarning OID is -2, turn off this outlet when the remaining UPS battery runtime is less than this value multiplied by the low battery warning time received from the UPS. See Example of a “Load-Shedding” Configuration (next page). - When the sPDUOutletConfigMSPgsLowBattWarning OID is set to -2, any value specified for this OID is ignored. • Define how long the outlet will wait between turning off and turning on after graceful shutdown. <ul style="list-style-type: none"> - -1: The outlet never turns on after a graceful shutdown. - 0 to 9999 intervals of 6 minutes each. Begin the outlet’s turn-on sequence after the specified number of intervals (e.g. 9999 = 999 hours, 54 minutes). • Define the number of seconds the outlet will wait before turning on after the UPS returns to online operation. <ul style="list-style-type: none"> - -1: Never turn on the outlet after the UPS returns to online operation. - 0 to 9999 seconds (0 seconds to 2 hours, 46 minutes, 39 seconds). • Define the number of seconds the outlet will wait after the server shuts down until the outlet begins its turn-off sequence. Allowed values are 0 to 9999. • Define the percentage of full battery capacity needed before the outlet is allowed to turn on. • Define the number of seconds the outlet will wait after the it turns off until it turns on during a reboot. Allowed values are 0 to 9999.

Example of a “Load-Shedding” Configuration

You can configure the eight outlets of the MasterSwitch Plus unit to turn off in up to seven stages during a power outage so that devices attached to those outlets shut down in an ordered sequence based on the importance you assign to them. Such “load shedding” allows you to extend UPS runtime to more important equipment by eliminating less significant equipment in stages from the UPS load as a power outage continues to reduce available battery runtime.

In the following table, which shows a sample load-shedding configuration, the following OID values are referenced:

- **Low Battery Warning** is the value of the `sPDUOutletConfigMSPgsLowBattWarning` OID.
- **Low Battery Multiplier** is the value of the `sPDUOutletConfigMSPgsLowBattMult` OID.

UPS Parameters			MasterSwitch Plus Unit Parameters			
Low Battery Signal Time	Runtime Remaining	UPS State	Outlet	Low Battery Warning	Low Battery Multiplier	Low Battery Multiplier x the Low Battery Signal Time of the UPS
25 minutes	60 minutes	On battery	1	60 six-second intervals (60 x 6 seconds = 6 minutes)	7	7 x 25 = 175 minutes
			2	60 six-second intervals (60 x 6 seconds = 6 minutes)	6	6 x 25 = 150 minutes
			3	120 six-second intervals (120 x 6 seconds = 12 minutes)	2	2 x 25 = 50 minutes
			4	70 six-second intervals (70 x 6 seconds = 7 minutes)	2	2 x 25 = 50 minutes
			5	-1: (Turn off the outlet based on runtime remaining.)	3	3 x 25 = 75 minutes
			6	-1: (Turn off the outlet based on runtime remaining.)	2	2 x 25 = 50 minutes
			7	-1: (Turn off the outlet based on runtime remaining.)	1	1 x 25 = 25 minutes
			8	-2: (Do not turn off the outlet.)	3	3 x 25 = 75 minutes

If the UPS's **Low Battery Signal Time** is set to **25** minutes, and the UPS switches to battery operation with **60** minutes of **Runtime Remaining**, the outlets will turn off as follows:

- Outlet 1 will begin its turn-off sequence immediately, without waiting the 6-minute **Low Battery Warning**, because the **Runtime Remaining** of 60 minutes is already less than 175 minutes (**Low Battery Multiplier x the Low Battery Signal Time of the UPS**).
- Outlet 2 will begin its turn-off sequence immediately, without waiting the 6-minute **Low Battery Warning**, because the **Runtime Remaining** of 60 minutes is already less than 150 minutes (**Low Battery Multiplier x the Low Battery Signal Time of the UPS**).
- Outlet 3 will begin its turn-off sequence after 10 minutes, when the **Runtime Remaining** is depleted to less 50 minutes (**Low Battery Multiplier x the Low Battery Signal Time of the UPS**). The full 12-minute **Low Battery Warning** will not yet have expired.
- Outlet 4 will begin its turn-off sequence when the 7-minute **Low Battery Warning** expires, instead of waiting until after 10 minutes when the **Runtime Remaining** would be depleted to less than 50 minutes (**Low Battery Multiplier x the Low Battery Signal Time of the UPS**).
- Outlet 5 will begin its turn-off sequence immediately because the 60-minute **Runtime Remaining** is already less than 75 minutes (**Low Battery Multiplier x the Low Battery Signal Time of the UPS**).
- Outlet 6 will begin its turn-off sequence after 10 minutes, when the **Runtime Remaining** is depleted to less than 50 minutes (**Low Battery Multiplier x the Low Battery Signal Time of the UPS**).
- Outlet 7 will begin its turn-off sequence after 35 minutes, when the **Runtime Remaining** is depleted to less than 25 minutes (**Low Battery Multiplier x the Low Battery Signal Time of the UPS**).
- Outlet 8 will not begin a turn-off sequence because the value defined for the **Low Battery Warning** indicates that the outlet should never turn off. The 75 minutes calculated as **Low Battery Multiplier x the Low Battery Signal Time of the UPS** is ignored.

[sPDUOutConfigMSPannun] Outlet Configuration OIDS

The [sPDUOutConfigMSPannun] category has a has a tabled set of OIDS to configure individual outlets in Annunciator mode.

OID	Task
<p>{sPDUOutletConfigMSPannunTable} {sPDUOutletConfigMSPannunEntry}</p> <p>sPDUOutletConfigMSPannunIndex sPDUOutletConfigMSPannunName</p> <p>sPDUOutletConfigMSPannunOutletIndex sPDUOutletConfigMSPannunOutletName</p> <p>sPDUOutletConfigMSPannunOutletCtrlMode</p> <p>sPDUOutletConfigMSPannunInitialState</p> <p>sPDUOutletConfigMSPannunAlarmActionDly</p>	<p>View and configure individual outlets in Annunciator Mode. The OID sPDUMasterStatusMSPOutletCount contains the number of entries in this table.</p> <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit 's entry (read only). • The name of the MasterSwitch Plus unit (read only). (You use the sPDUMasterConfigMSPName OID to define this name). • The outlet number (read only) • The name of the outlet (read only). (You use the sPDUOutletConfigMSPallOutletName OID to define this name). • The control mode of the outlet, as defined by the OID sPDUOutletConfigMSPallOutletCtrlMode: <ul style="list-style-type: none"> - modeGracefulShutdown: (1): The outlet is in Graceful Shutdown control mode. - modeAnnunciator (2): The outlet is in Annunciator control mode. • Define the initial (default) state of the outlet: <ul style="list-style-type: none"> - initialStateOff (1): The outlet defaults to off when in the non-alarmed condition. - initialStateOn (2): The outlet defaults to on when in the non-alarmed condition. • Define the time in seconds that an alarm from an Environmental Monitor must continue before it causes an alarm condition. Allowed values are 0 to 9999 seconds (2 hours, 46 minutes, 38 seconds) If the alarm is disabled for the outlet, as described in [sPDUOutConfigMSPmups] Outlet Configuration OIDS, this OID's value is ignored.

[sPDUOutConfigMSPmups] Outlet Configuration OIDs

The **[sPDUOutConfigMSPmups]** category has a has a tabled set of OIDs to configure individual outlets to begin their turn-off sequence in response to alarm conditions from the Environmental Monitor or to ignore those alarm conditions.

OID	Task
<p>{sPDUOutletConfigMSPmupsTable} {sPDUOutletConfigMSPmupsEntry}</p> <p>sPDUOutletConfigMSPmupsIndex sPDUOutletConfigMSPmupsName</p> <p>sPDUOutletConfigMSPmupsOutletIndex sPDUOutletConfigMSPmupsOutletName</p> <p>sPDUOutletConfigMSPmupsZone1 sPDUOutletConfigMSPmupsZone2 sPDUOutletConfigMSPmupsZone3 sPDUOutletConfigMSPmupsZone4</p> <p>sPDUOutletConfigMSPmupsP1LowHum</p> <p>sPDUOutletConfigMSPmupsP1HiHum</p> <p>sPDUOutletConfigMSPmupsP1LowTemp</p> <p>sPDUOutletConfigMSPmupsP1HiTemp</p> <p>sPDUOutletConfigMSPmupsP2LowHum</p> <p>sPDUOutletConfigMSPmupsP2HiHum</p> <p>sPDUOutletConfigMSPmupsP2LowTemp</p> <p>sPDUOutletConfigMSPmupsP2HiTemp</p>	<p>View and configuration a specified outlet. (The sPDUOutletConfigMSPmupsTable OID identifies the number of table entries.)</p> <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry (read only). • The name of the MasterSwitch Plus unit (read only). (You use the sPDUOutletConfigMSPmupsName OID to define this name). • The outlet number (read only) • The name of the outlet (read only). (You use the sPDUOutletConfigMSPmupsOutletName OID to define this name). • For this outlet, enable or disable any of the alarms for zone 1, 2, 3, or 4 that the Environmental Monitor is monitoring. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm for the zone number in the OID name, e.g. to disable the alarm for zone 3, set this value for the OID sPDUOutletConfigMSPmupsZone3. - enableAlarm (2): Enable the alarm for the zone number in the OID name. • Enable or disable the Probe 1 low humidity alarm for the outlet. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm. • Enable or disable the Probe 1 high humidity alarm for the outlet. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm. • Enable or disable the Probe 1 low temperature alarm for the outlet. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm. • Enable or disable the Probe 1 high temperature alarm for the outlet. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm. • For this outlet, enable or disable the Probe 2 low humidity alarm. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm. • Enable or disable the Probe 2 high humidity alarm for the outlet. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm. • Enable or disable the Probe 2 low temperature alarm for the outlet. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm. • Enable or disable the Probe 2 high temperature alarm for the outlet. <ul style="list-style-type: none"> - disableAlarm (1): Disable the alarm. - enableAlarm (2): Enable the alarm.

[sPDUOutletStatusMSP] Outlet Status OIDs

The [sPDUOutletStatusMSP] category has a tabled set of OIDs that provides information on the status of the outlets for MasterSwitch Plus unit.

OID	Information Provided
<p>{sPDUOutletStatusMSPTable} {sPDUOutletStatusMSPEntry}</p> <p>sPDUOutletStatusMSPIndex sPDUOutletStatusMSPName</p> <p>sPDUOutletStatusMSPOutletIndex sPDUOutletStatusMSPOutletName</p> <p>sPDUOutletStatusMSPOutletState</p> <p>sPDUOutletStatusMSPCommandPending</p> <p>sPDUOutletStatusMSPOutletCtrlMode</p>	<p>View status information for a specified outlet. (The sPDUOutletStatusMSPOutletCount OID identifies the number of table entries.)</p> <ul style="list-style-type: none"> • The index to the MasterSwitch Plus unit's entry (read only). • The name of the MasterSwitch Plus unit (read only). (You use the sPDUOutletStatusMSPName OID to define this name). • The outlet number (read only) • The name of the outlet (read only). (You use the sPDUOutletStatusMSPOutletName OID to define this name). • One of the following: <ul style="list-style-type: none"> - outletStatusOnMSP (1) if the outlet is on - outletStatusOffMSP (2) if the outlet is off • One of the following: <ul style="list-style-type: none"> - outletStatusMSPCommandPending (1) if a command is pending on the outlet. - outletStatusMSPNoCommandPending (2) if no command is pending on the outlet. • The control mode of the outlet, as defined by the OID sPDUOutletStatusMSPOutletCtrlMode: <ul style="list-style-type: none"> - modeGracefulShutdown: (1): In Graceful Shutdown control mode, the outlet turns off after a server supported by the UPS has completed a graceful shutdown. - modeAnnunciator (2): In Annunciator control mode, the outlet turns off in response to an environmental alarm from an Environmental Monitor and turns on when the cause is resolved.

Chapter 8: How to Manage an Automatic Transfer Switch

This chapter describes how to use PowerNet MIB OIDs to manage (monitor, configure, control and test) an Automatic Transfer Switch. The Automatic Transfer Switch also has an embedded Network Management Card. To manage that management card, see **Chapter 2, How to Manage Agents and Management Cards**.

To list the seven categories of PowerNet MIB OIDs that you use to manage an Automatic Transfer Switch, perform the following steps:

1. Select **[products]** under **[apc]**.
2. Select **[hardware]**.
3. Select **[automaticTransferSwitch]**.

OID Categories	Tasks
[atsIdent]	Identify the Automatic Transfer Switch by its identification parameter values. See [atsIdent] Identification OIDs .
[atsCalibration]	View information about the Automatic Transfer Switch's input and output lines, their phases, and their calibration factors. See [atsCalibration] Calibration OIDs .
[atsControl]	Directly affect the overall operation of the Automatic Transfer Switch. See [atsControl] Control OIDs .
[atsConfig]	Modify parameters that affect the overall operation of the Automatic Transfer Switch. See [atsConfig] Configuration OIDs .
[atsStatus]	View the status of the Automatic Transfer Switch, and reset the recording of minimum and maximum values that occurred for various operational parameters. See [atsStatus] Status OIDs .
[atsStatusinput]	View the status of the input feeds of the Automatic Transfer Switch and their phases, including, for each phase, information on voltage, current, and power. Also view or change the configured name for each input feed. See [atsStatusInput] Input OIDs .
[atsStatusOutput]	View the status of the output feeds of the Automatic Transfer Switch and their phases, including, for each phase, information on voltage, current, power, load, and percentage of load capacity being used. See [atsStatusOutput] Output OIDs .

[atsIdent] Identification OIDs

The [atsIdent] category has eight read-only OIDs that return values for Automatic Transfer Switch identification parameters.



Note:

The first six OIDs in the following table are set at the factory.

OID	Information Reported
atsIdentHardwareRev	The hardware version of the Automatic Transfer Switch.
atsIdentFirmwareRev	The firmware version of the Automatic Transfer Switch.
atsIdentFirmwareDate	The date of release for this Automatic Transfer Switch firmware version.
atsIdentDateOfManufacture	The date on which the Automatic Transfer Switch unit completed the manufacturing process, in <i>mm/dd/yyyy</i> format.
atsIdentModelNumber	The model number of the Automatic Transfer Switch.
atsIdentSerialNumber	The serial number of the Automatic Transfer Switch.
atsIdentNominalLineVoltage	The RMS utility voltage in volts.
atsIdentNominalLineFrequency	The utility power frequency in Hz.

[atsCalibration] Calibration OIDs

The [atsCalibration] category has five read-only OIDs and three tabled sets of read-only OIDs that return values related to the Automatic Transfer Switch's input lines and output lines, including information on their phases and calibration factors. The OIDs also identify the number, type, and calibration factors of power supplies supported.

OID	Information Reported
atsCalibrationNumInputs	The number of input lines to this device.
atsCalibrationNumInputPhases	The number of phases per input line for this device.
{atsCalibrationInputTable} {atsCalibrationInputPhaseEntry} atsCalibrationInputTableIndex atsCalibrationInputPhaseTableIndex atsLineVoltageCalibrationFactor	A tabled set of OIDs providing the following information for each phase of an input line: <ul style="list-style-type: none"> • The input identifier. • The input phase identifier. • The Line Voltage Calibration factor (set at the factory).
atsCalibrationPowerSupplyVoltages	The number of power supply voltages that this device supports, which defines the number of rows in atsCalibrationPowerSupplyVoltageTable (one entry per supported voltage: 24V, 12V and 5V).
{atsCalibrationPowerSupplyVoltageTable} {atsCalibrationPowerSupplyVoltageEntry} atsCalibrationPowerSupplyVoltageTableIndex atsCalibrationPowerSupplyVoltage atsPowerSupplyVoltageCalibrationFactor	A tabled set of OIDs providing the following information for each power supply voltage supported by this device: <ul style="list-style-type: none"> • The power supply voltage identifier: 24 V (1), 12 V (2), or 5 V (3). • A description of the power supply voltage: powerSupply24V (1), powerSupply12V (2), or powerSupply (3). • The Line Voltage Calibration factor (set at the factory).
atsCalibrationNumOutputs	The number of output lines from this device. This number defines the number of rows in atsCalibrationOutputTable .
atsCalibrationNumOutputPhases	The number of output phases used in this device.
{atsCalibrationOutputTable} {atsCalibrationOutputEntry} atsCalibrationOutputTableIndex atsCalibrationOutputPhasesTableIndex atsOutputCurrentCalibrationFactor	A tabled set of OIDs providing the following information for each output line: <ul style="list-style-type: none"> • The output identifier. • Description of each calibration factor for each output phase used in this device and one for neutral: phase 1 (1), phase 2 (2), phase 3 (3), and neutral (4). • The output current calibration factor measured in Amps.

[atsControl] Control OIDs

The [atsControl] category has two read-write OIDs that provide commands to control the resetting of the Automatic Transfer Switch and the clearing of all its alarms.

OID	Task
atsControlResetATS	Setting this variable determines whether the Automatic Transfer Switch performs a reset when power is applied. none (1) : Does not perform a reset. reset (2) : Performs a power-on reset.
atsControlClearAllAlarms	Setting this variable determines whether all alarms in the Automatic Transfer Switch are cleared. none (1) : Does not clear alarms. clear (2) : Clears all alarms.

[atsConfig] Configuration OIDs

The [atsConfig] category has seven read-write OIDs that provide commands to configure the Automatic Transfer Switch.

OID	Task
atsConfigProductName	A character string that names the Automatic Transfer Switch.
atsConfigPreferredSource	The preferred source of power when both sources are functioning properly: source A (1) , source B (2) , or none (3)
atsConfigFrontPanelLockout	Determines whether you can set source preference from the Automatic Transfer Switch's front panel: disableFrontPanel (1) : Disables the capability to set source preference for the Automatic Transfer Switch from its Front Panel. To re-enable this capability, you must use the serial interface of the Automatic Transfer Switch. enableFrontPanel (2) : Allows setting source preference for the Automatic Transfer Switch from its Front Panel.
atsConfigVoltageSensitivity	Defines the sensitivity of the Automatic Transfer Switch to changes in voltage: high (1) : Provides the best protection low (2) : Allows the Automatic Transfer Switch to tolerate frequent small line voltage changes.
atsConfigTransferVoltageRange	Defines the range of acceptable voltage from a power source: wide (1) , medium (2) , or narrow (3) . If the voltage from the selected input source is not within this range, the Automatic Transfer Switch switches to the alternate power source.
atsConfigCurrentLimit	The threshold (in Amps) at which an Over Current Alarm is generated.
atsConfigResetValues	Resets the configuration of the Automatic Transfer Switch to its default values. do not reset (1) or reset (2) .

[atsStatus] Status OIDs

The [atsStatus] category has six read-only OIDs that report the status of Automatic Transfer Switch components and operation and one read-write OID that you can use to restart the recording of minimum and maximum values that occurred for various operational parameters of the Automatic Transfer Switch.

OID	Information Reported
atsStatusCommStatus	The current communication status of the Automatic Transfer Switch: atsNeverDiscovered (1) , atsCommEstablished (2) , or atsCommLost (3) .
atsStatusSelectedSource	The current source of power to the Automatic Transfer Switch: source A (1) or source B (2) .
atsStatusRedundancyState	The Automatic Transfer Switch's current state of redundancy: <ul style="list-style-type: none"> • atsRedundancyLost (1): The Automatic Transfer Switch cannot switch to the alternate power source if the power source that it is using fails. • atsFullyRedundant (2): The Automatic Transfer Switch can switch to the alternate power source if the power source that it is using fails.
atsStatusOverCurrentState	The state of the output current of the Automatic Transfer Switch: <ul style="list-style-type: none"> • atsOverCurrent (1): The Automatic Transfer Switch has exceeded the output current threshold and cannot switch to the alternate power source if the source that it is using fails. • atsCurrentOK (2): The output current is below the output current threshold.
atsStatus5VPowerSupply	The current state of the Automatic Transfer Switch's 5-volt power supply: <ul style="list-style-type: none"> • atsPowerSupplyFailure (1): The power supply has failed, and the Automatic Transfer Switch's internal Configuration menu, which you access through a serial port connection, is not accessible. • atsPowerSupplyOK (2): The power supply is operating correctly (within tolerance).
atsStatus24VPowerSupply	The current state of the Automatic Transfer Switch's 24-volt power supply: <ul style="list-style-type: none"> • atsPowerSupplyFailure (1): The power supply has failed and the Automatic Transfer Switch cannot switch to the alternate power source if the source that it is using fails. • atsPowerSupplyOK (2): The power supply is operating correctly (within tolerance).

OID	Information Reported
<p>atsStatusResetMaxMinValues</p>	<p>Resets the following maximum and minimum Automatic Transfer Switch values, which are the maximum and minimum Automatic Transfer Switch values recorded since the last time they were read or reset by atsStatusResetMaxMinValues.</p> <p>none (1): Do not reset the values.</p> <p>reset (2): Reset the values.</p> <p>Parameters that are unsupported by your model of the Automatic Transfer Switch return -1.</p> <ul style="list-style-type: none"> • atsInputMaxVoltage • atsInputMinVoltage • atsInputMaxCurrent • atsInputMinCurrent • atsInputMaxPower • atsInputMinPower • atsOutputMaxCurrent • atsOutputMinCurrent • atsOutputMaxLoad • atsOutputMinLoad • atsOutputMaxPercentLoad • atsOutputMinPercentLoad • atsOutputMaxPower • atsOutputMinPower • atsOutputMaxPercentPower • atsOutputMinPercentPower <p>You can set this OID to either of the following values:</p> <p>none (1): Do not reset the minimum and maximum values.</p> <p>reset (2): Reset the minimum and maximum values.</p> <p>Parameters that are unsupported by your model of the Automatic Transfer Switch return -1.</p>

[atsStatusInput] Input OIDs

The [atsStatusInput] category has an OID and two tabled set of OIDs that provide information on the Automatic Transfer Switch's input feeds and their phases. All OIDs in this category are read-only except **atsInputName**, which is read-write.

OID	Information Reported
atsNumInputs	The number of input feeds to this device. This number defines the number of rows in atsInputTable .
{atsInputTable} {atsInputEntry} atsInputTableIndex atsNumInputPhases atsInputVoltageOrientation atsInputFrequency atsInputType atsInputName	<p>A tabled set of OIDs providing the following information for each input feed:</p> <ul style="list-style-type: none"> The input feed identifier. The number of input phases used in this device. This number defines the number of rows in atsInputPhaseTable. The input voltage orientation: <ul style="list-style-type: none"> unknown (1): Unknown for this source. singlePhase (2): Phase 1 voltage is between Phase 1 and neutral. splitPhase (3): Phase 1 voltage is between Phase 1 and Neutral; phase 2 voltage is between Phase 2 and Neutral; and phase 3 voltage is between Phase 1 and Phase 2. threePhasePhaseToNeutral (4): Phase 1 voltage is between Phase 1 and Neutral; phase 2 voltage is between Phase 2 and Neutral; and phase 3 voltage is between Phase3 and Neutral. threePhasePhaseToPhase (5): Phase 1 voltage is between Phase 1 and Phase 2; phase 2 voltage is between Phase 2 and Phase 3; and phase 3 voltage is between Phase 3 and Phase 1. The input frequency in Hz, or -1 if it is unsupported by this source. The input type. The name given to this input. This value is read-write.

OID	Information Reported
<p>{atsInputPhaseTable} {atsInputPhaseEntry}</p> <p>atsInputPhaseTableIndex atsInputPhaseIndex atsInputVoltage atsInputMaxVoltage atsInputMinVoltage atsInputCurrent atsInputMaxCurrent atsInputMinCurrent atsInputPower atsInputMaxPower atsInputMinPower</p>	<p>A tabled set of OIDs providing the following information for each input phase. Parameters that are unsupported by your model of the Automatic Transfer Switch return -1.</p> <ul style="list-style-type: none"> • The input identifier. • The input phase identifier. • The input voltage in VAC. • The maximum input voltage in VAC recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The minimum input voltage in VAC recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The input current in Amps. • The maximum input current in Amps recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The minimum input current in Amps recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The input power in Watts. • The maximum input power in Watts recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The minimum input power in Watts recorded since the last time this value was read or reset by atsStatusResetMaxMinValues.

OID	Information Reported
<p>{atsOutputPhaseTable} {atsOutputPhaseEntry}</p> <p>atsOutputPhaseTableIndex atsOutputPhaseIndex</p> <p>atsOutputVoltage atsOutputCurrent</p> <p>atsOutputMaxCurrent</p> <p>atsOutputMinCurrent</p> <p>atsOutputLoad atsOutputMaxLoad atsOutputMinLoad</p> <p>atsOutputPercentLoad atsOutputMaxPercentLoad atsOutputMinPercentLoad</p> <p>atsOutputPower atsOutputMaxPower atsOutputMinPower</p> <p>atsOutputPercentPower atsOutputMaxPercentPower atsOutputMinPercentPower</p>	<p>A tabled set of OIDs providing the following information for each output phase: Parameters that are unsupported by your model of the Automatic Transfer Switch return -1.</p> <ul style="list-style-type: none"> • The output identifier. • Description of each output phase used in this device and one for neutral: phase 1 (1), phase 2 (2), phase 3 (3), and neutral (4). • The output voltage in VAC. • The output current, in 0.1 Amps, drawn by the load on the Automatic Transfer Switch • The maximum output current in 0.1 Amps recorded since the last time this value was read or reset by atsStatusResetMaxMinValues • The minimum output current in 0.1 Amps recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The output load in VA. • The maximum output load in VA recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The minimum output load in VA recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The percentage of the Automatic Transfer Switch's load capacity being used on this output phase at a redundancy of (n + x). • The maximum percentage of the Automatic Transfer Switch's load capacity being used on this output phase at a redundancy of (n + x) that has been recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The minimum percentage of the Automatic Transfer Switch's load capacity being used on this output phase at a redundancy of (n + x) that has been recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The output power in Watts. • The maximum output power in Watts recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The minimum output power in Watts recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The percentage of the Automatic Transfer Switch's power capacity being used on this output phase at a redundancy of (n + x). • The maximum percentage of the Automatic Transfer Switch's power capacity being used on this output phase at a redundancy of (n + x) that has been recorded since the last time this value was read or reset by atsStatusResetMaxMinValues. • The minimum percentage of the Automatic Transfer Switch's power capacity being used on this output phase at a redundancy of (n + x) that has been recorded since the last time this value was read or reset by atsStatusResetMaxMinValues.

Chapter 9: PowerNet MIB Traps

This chapter describes the PowerNet MIB traps that a Management Card, PowerNet Agent, MasterSwitch unit, or Automatic Transfer Switch can send to an NMS to alert the NMS that a specific event has occurred and describes how to define which NMSs can receive those traps. (See [How To Define Trap Receivers](#).)

Devices and Agents and the Traps They Can Generate		
Management Card	PowerNet Agent	MasterSwitch Models
All UPS traps	Only UPS traps supported for an Agent by the PowerNet MIB 2.2	Traps specific to the MasterSwitch model <ul style="list-style-type: none"> • Traps 41 through 48 for a MasterSwitch unit • Traps 85 through 97 for MasterSwitch VM unit • Traps 98 to 103 for a MasterSwitch Plus unit
All external Environmental Monitor traps	The two traps supported for an Environmental Monitor by the PowerNet MIB 2.2	Traps related to restarting the internal SNMP agent.
All Integrated Environmental Monitor traps (AP9618 and AP9619 only)		
Traps related to restarting the SNMP agent or downloading new code		
All DC Power Plant traps (Traps 110 through 120, and Traps 136 through 162)		
All Automatic Transfer Switch traps (Traps 126 through 135)		

The PowerNet MIB 3.4.4 supports sending 175 APC enterprise-specific traps (numbered 1 through 176, with number 40 unused). The PowerNet MIB 2.2 supported only 32 traps.

No device can generate all 175 traps. For example, some traps report only events related to a MasterSwitch unit, which has its own SNMP agent. Even if a device can send a trap, no NMS can receive the trap until at least one of the four trap receiver definitions exists for the device. By default, all Management Cards, Agents, MasterSwitch units, and Automatic Transfer Switches have no trap receivers defined. (See [How To Define Trap Receivers](#).)

Trap Severity Levels

Each trap has one of the following severity levels.

Severe	Warning	Informational
Alerts a trap receiver of an event that requires immediate corrective action.	Alerts a trap receiver of an event that can adversely affect a device's operation if the situation worsens.	Alerts a trap receiver of an event that can not adversely affect a device's operation.

How To Define Trap Receivers

Each Management Card, PowerNet Agent, MasterSwitch unit, and Automatic Transfer Switch can send traps to as many as four trap receivers. You define an NMS as a trap receiver using that NMS's IP address. You can also define other values for each trap receiver, such as the password (community string) that traps must use when they are sent to a specific trap receiver.

To access the PowerNet MIB OIDs that you can use to define a trap receiver, perform these steps:

1. Select **[apcmgmt]** under **[apc]**.
2. Select **[mconfig]**.

OID	Task
mconfigNumTrapReceivers	Identify the number of NMSs to receive traps (always 4).
{mconfigTrapReceiverTable} {mconfigTrapReceiverEntry} trapIndex receiverAddr communityString severity acceptThisReceiver receiveTrapType	Use this table set of OIDs to define parameters for each trap receiver: <ul style="list-style-type: none"> • Identify the trap receiver's number (i.e. the read-only index to the trap receiver entry). • Define the NMS as a trap receiver by the NMS's IP address. The default value, 0 . 0 . 0 . 0, means that no NMS can receive traps. • Define the password (community name) a trap must use. • Identify the severity of traps to send to this NMS. Only traps of a severity equal to or greater than this value are sent. See Trap Severity Levels for definitions of the following severity levels: <ul style="list-style-type: none"> -information (1) -warning (2) -severe (3) • Enable or disable sending traps to this NMS. <ul style="list-style-type: none"> -yes (1): Enable sending traps. -no (2): Disable sending traps. • Define the type of traps this NMS will receive. You must use powernet (1) with a Management Card.

PowerNet MIB Trap Definitions

APC devices can generate the traps defined in the following table:

Trap	Severity	Number and Description (Sheet 1 of 9)
communicationLost	Severe	1: The Management Card's SNMP Agent lost communication with the UPS.
upsOverload	Severe	2: The UPS sensed a load greater than the rated-load capacity.
upsDiagnosticsFailed	Severe	3: The UPS failed a self-test.
upsDischarged	Severe	4: A low-battery condition exists; runtime may not be sufficient if input power fails.
upsOnBattery	Warning	5: The UPS switched to battery power.
smartBoostOn	Warning	6: UPS enabled its AVR Boost feature.
lowBattery	Severe	7: The UPS batteries will be exhausted soon if power is not restored
communicationEstablished	Informational	8: The Management Card's SNMP Agent established communication with the UPS.
powerRestored	Informational	9: Utility power restored.
upsDiagnosticsPassed	Informational	10: The UPS passed a self-test.
returnFromLowBattery	Informational	11: The UPS returned from a low battery condition.
upsTurnedOff	Warning	12: The UPS was turned off.
upsSleeping	Warning	13: The UPS entered sleep mode.
upsWokeUp	Informational	14: The UPS exited sleep mode.
upsRebootStarted	Warning	15: The UPS started a reboot sequence.
upsDipSwitchChanged	Warning	16: A DIP switch setting has changed and could alter UPS performance.
upsBatteryNeedsReplacement	Severe	17: A UPS battery needs replacement.
contactFault	Severe	18: The Environmental Monitor contact <i>x</i> has changed from its normal position.
contactFaultResolved	Informational	19: The Environmental Monitor contact <i>x</i> has returned to its normal position.
hardwareFailureBypass	Severe	20: The Matrix-UPS switched to bypass due to a hardware failure.
softwareBypass	Warning	21: The Matrix-UPS was put on bypass by software or by the UPS front panel.
switchedBypass	Warning	22: The Matrix-UPS was put on bypass by the switch at the UPS.

Trap	Severity	Number and Description (Sheet 2 of 9)
returnFromBypass	Informational	23: The Matrix-UPS returned from bypass mode.
bypassPowerSupplyFailure	Severe	24: The Matrix-UPS base module bypass power supply needs repair.
baseFanFailure	Severe	25: The Matrix-UPS base module fan needs repair
batteryPackCommLost	Severe	26: Communication with external battery packs was lost (Matrix-UPS or Smart-UPS XL).
batteryPackCommEstablished	Informational	27: Communication with external battery packs was regained (Matrix-UPS or Smart-UPS XL).
calibrationStart	Informational	28: A runtime calibration has started.
restartAgent	Informational	29: The Management Card's SNMP agent is restarting as commanded by the NMS
upsTurnedOn	Informational	30: The UPS is turned on.
smartTrimOn	Warning	31: The UPS enabled its AVR Trim feature.
codeAuthenticationDone	Informational	32: Authentication of TFTP agent file code image is done.
upsOverloadCleared	Informational	33: The UPS overload condition is corrected.
smartBoostOff	Informational	34: The Smart-UPS returned from using its AVR Boost feature.
smartAvrReducingOff	Informational	35: The Matrix-UPS returned from using AVR Trim feature.
upsBatteryReplaced	Informational	36: Bad battery replaced.
calibrationEnd	Informational	37: Runtime calibration ended.
dischargeCleared	Informational	38: UPS discharge condition ended.
gracefullShutdown	Informational	39: Graceful shutdown started.
<i>Not currently used.</i>	<i>none</i>	40: <i>No value.</i>
outletOn	Informational	41: The MasterSwitch outlet specified by SPDUOutletControlIndex is turned on or, if that value is 0 , all outlets are turned on.
outletOff	Informational	42: The MasterSwitch outlet specified by SPDUOutletControlIndex is turned off or, if that value is 0 , all outlets are turned off.
outletReboot	Informational	43: The MasterSwitch outlet specified by SPDUOutletControlIndex was rebooted or, if that value is 0 , all outlets were rebooted.
configChange	Warning	44: The MasterSwitch SNMP configuration changed.

Trap	Severity	Number and Description (Sheet 3 of 9)
configChangeOutlet	Warning	45: The configuration of the MasterSwitch outlet specified by SPDUOutletConfigIndex changed, or if that value is 0 , the master outlet configuration changed.
accessViolationConsole	Warning	46: Three unsuccessful MasterSwitch console login attempts occurred.
accessViolationHTTP	Warning	47: An unsuccessful MasterSwitch HTTP login attempt occurred.
passwordChange	Warning	48: The MasterSwitch console password has changed.
badVoltage	Warning	49: The UPS output voltage is not within the acceptable range.
badVoltageCleared	Informational	50: The UPS output voltage is again within the acceptable range.
chargerFailure	Warning	51: The UPS battery charger has failed.
chargerFailureCleared	Informational	52: The UPS battery charger has returned to normal operation.
batteryOverTemperature	Warning	53: The UPS battery temperature exceeded the temperature threshold.
batteryOverTemperatureCleared	Informational	54: The UPS battery temperature no longer exceeds the temperature threshold.
smartRelayFault	Warning	55: The AVR Boost or AVR Trim relay failed.
smartRelayFaultCleared	Informational	56: The AVR Boost or AVR Trim relay failure is corrected
humidityThresholdViolation1	Warning	57: The Environmental Monitor probe 1 humidity threshold violated.
humidityThresholdViolationCleared1	Informational	58: The Environmental Monitor probe 1 humidity threshold is no longer violated.
TemperatureThresholdViolation1	Warning	59: The Environmental Monitor probe 1 temperature threshold violated.
TemperatureThresholdViolationCleared1	Informational	60: The Environmental Monitor probe 1 temperature threshold is no longer violated
humidityThresholdViolation2	Warning	61: The Environmental Monitor probe 2 humidity threshold violated.
humidityThresholdViolationCleared2	Informational	62: The Environmental Monitor probe 2 humidity threshold is no longer violated.
TemperatureThresholdViolation2	Warning	63: The Environmental Monitor probe 2 temperature threshold violated.
TemperatureThresholdViolationCleared2	Informational	64: The Environmental Monitor probe 2 temperature threshold is no longer violated

Trap	Severity	Number and Description (Sheet 4 of 9)
mupsCommunicationEstablished	Informational	65: Communication with the Environmental Monitor has been established.
mupsCommunicationLost	Warning	66: Communication with the Environmental Monitor was lost.
batteryIncrease	Informational	67: The number of Symmetra UPS batteries was increased.
batteryDecrease	Informational	68: The number of Symmetra UPS batteries was decreased.
powerModuleIncrease	Informational	69: The number of Symmetra UPS power modules was increased.
powerModuleDecrease	Informational	70: The number of Symmetra UPS power modules was decreased.
intelligenceModuleInserted	Informational	71: An intelligence module was inserted into the Symmetra UPS.
intelligenceModuleRemoved	Informational	72: An intelligence module was removed from the Symmetra UPS.
rintelligenceModuleInserted	Informational	73: A redundant intelligence module was inserted into the Symmetra UPS.
rintelligenceModuleRemoved	Informational	74: A redundant intelligence module was removed from the Symmetra UPS.
extBatteryFrameIncrease	Informational	75: An external battery frame was added to the Symmetra UPS.
extBatteryFrameDecrease	Informational	76: An external battery frame was removed from the Symmetra UPS.
abnormalCondition	Severe	77: The Symmetra UPS has an abnormal condition. See Symmetra UPS Subtraps for the subtraps that identify which abnormal condition has occurred.
abnormalConditionCleared	Informational	78: The Symmetra UPS abnormal condition is corrected. See Symmetra UPS Subtraps for the subtraps that identify which abnormal condition has been corrected.
deviceStatusChange	Informational	79: The status of the device being monitored has changed.
noBatteries	Warning	80: The UPS has no batteries attached.
noBatteriesCleared	Informational	81: Batteries have been attached to the UPS
userAdded	Informational	82: A new user has been added.
userDeleted	Informational	83: A user has been deleted.
userModified	Informational	84: A user has been modified.

Trap	Severity	Number and Description (Sheet 5 of 9)
msvmCommunicationEstablished	Informational	85: Communication with the MasterSwitch VM unit has been established.
msvmCommunicationLost	Severe	86: Communication with the MasterSwitch VM unit has been lost.
msvmOverload	Severe	87: The MasterSwitch VM unit is near or at an overload condition.
msvmOverloadCleared	Informational	88: The overload condition on the MasterSwitch VM unit has been cleared.
msvmOutletOn	Informational	89: An outlet on the MasterSwitch VM unit has turned on.
msvmOutletOff	Informational	90: An outlet on the MasterSwitch VM unit has turned off.
msvmDeviceConfigChange	Informational	91: A device configuration change was made on the MasterSwitch VM unit.
msvmOutletConfigChange	Informational	92: An outlet configuration change was made on the MasterSwitch VM unit.
msvmLowLoad	Informational	93: The MasterSwitch VM unit has violated the low load threshold
msvmLowLoadCleared	Informational	94: The low load condition on the MasterSwitch VM unit has been corrected.
msvmNearOverload	Severe	95: The MasterSwitch VM unit is near or at an overload condition
msvmNearOverloadCleared	Informational	96: The overload condition on the MasterSwitch VM unit has been corrected.
msvmPowerSupplyStatusChange	Informational	97: The status of the power supply on the MasterSwitch VM unit has changed.
mspCommunicationEstablished	Informational	98: Communication with the MasterSwitch Plus unit has been established.
mspCommunicationLost	Informational	99: Communication with the MasterSwitch Plus unit has been lost.
mspOutletOn	Informational	100: An outlet on the MasterSwitch Plus unit has turned on.
mspOutletOff	Informational	101: An outlet on the MasterSwitch Plus unit has turned off.
mspDeviceConfigChange	Informational	102: A device configuration change was made on the MasterSwitch Plus unit.
mspOutletConfigChange	Informational	103: An outlet configuration change was made on the MasterSwitch Plus unit.

Trap	Severity	Number and Description (Sheet 6 of 9)
rsSourceSwitched	Informational	<p>104: The Redundant Switch has switched source.</p> <ul style="list-style-type: none"> -The first variable represents the current source: 0 for A, 1 for B. -The second variable is the 32-character name of the source. -The third variable represents the transfer cause: <ul style="list-style-type: none"> • 0: no transfers recorded • 1: user action or preferred switching • 3: line notch or spike • 5: low line voltage • 7: high line voltage • 9: frequency out of range -The fourth variable is a character string listing the transfer cause.
rsLostRedundancy	Severe	<p>105: The Redundant Switch has lost redundancy. The variables identify the source that is no longer available:</p> <ul style="list-style-type: none"> -The first variable represents the current source: 0 for A, 1 for B. -The second variable is the 32-character name of the source.
rsRedundancyRestored	Informational	<p>106: Redundancy has been restored to the source. The variables identify the source to which power has been restored:</p> <ul style="list-style-type: none"> -The first variable represents the current source: 0 for A, 1 for B. -The second variable is the 32-character name of the source.
rsConfigChange	Informational	<p>107: A configuration change was made on a Redundant Switch.</p>
rsCommunicationEstablished	Informational	<p>108: Communications with the Redundant Switch is established.</p>
rsCommunicationLost	Severe	<p>109: Communications with the Redundant Switch has been lost.</p>
dcCommunicationEstablished	Informational	<p>110: Communications with the DC power plant has been established.</p>
dcCommunicationLost	Severe	<p>111: Communications with the DC power plant has been lost.</p>
dcActivePINChanged	Informational	<p>112: The active PIN on the DC controller has been changed.</p>

Trap	Severity	Number and Description (Sheet 7 of 9)
dcMajorAlarm	Severe	113: A Major alarm is active in the DC power plant.
dcMajorAlarmCleared	Informational	114: A Major alarm is no longer active in the DC power plant.
dcMinorAlarm	Severe	115: A Minor alarm is active in the DC power plant.
dcMinorAlarmCleared	Informational	116: A Minor alarm is no longer active in the DC power plant.
dcOutputRelayOn	Warning	117: An output relay has gone on in the DC power plant.
dcOutputRelayOff	Informational	118: An input relay has gone off in the DC power plant.
dcInputRelayOn	Warning	119: An input relay has gone on in the DC power plant.
dcInputRelayOff	Informational	120: An output relay has gone off in the DC power plant.
logicPowerSuppliesIncreased	Informational	121: The number of logic power supplies has increased at the Symmetra 3-Phase UPS.
logicPowerSuppliesDecreased	Informational	122: The number of logic power supplies has decreased at the Symmetra 3-Phase UPS.
externalSwitchGearClosed	Informational	123: The identified external switch gear at the Symmetra 3-Phase UPS is closed.
externalSwitchGearOpened	Informational	124: The identified external switch gear at the Symmetra 3-Phase UPS is open
generalDeviceEvent	Informational	125: The identified general event occurred at the Symmetra 3-Phase UPS.
atsSourceSwitched	Informational	126: The Automatic Transfer Switch has switched source.
atsLostRedundancy	Severe	127: The Automatic Transfer Switch has lost redundancy.
atsRedundancyRestored	Informational	128: Redundancy has been restored to the Automatic Transfer Switch.
atsConfigChange	Informational	129: A configuration change has been made on a Automatic Transfer Switch.
atsCommunicationEstablished	Informational	130: Communications with the Automatic Transfer Switch has been established.
atsCommunicationLost	Severe	131: Communications with the Automatic Transfer Switch has been lost.
atsOverCurrent	Severe	132: Output Current of the Automatic Transfer Switch has exceeded threshold.

Trap	Severity	Number and Description (Sheet 8 of 9)
atsOverCurrentCleared	Informational	133: Output Current of the Automatic Transfer Switch has returned below threshold.
atsPowerSupplyFailure	Severe	134: The Automatic Transfer Switch Power Supply has failed.
atsPowerSupplyFailureCleared	Informational	135: The Automatic Transfer Switch Power Supply failure cleared.
dcMainsFailAlarm	Warning	136: A Mains Fail alarm is active in the DC power plant.
dcMainsFailAlarmCleared	Informational	137: Mains Fail alarm is no longer active in the DC power plant.
dcFanFailAlarm	Warning	138: A Fan Fail alarm is active in the DC power plant.
dcFanFailAlarmCleared	Informational	139: A Fan Fail alarm is no longer active in the DC power plant.
dcRectifierOvertempAlarm	Warning	140: Rectifier Overtemp alarm is active in the DC power plant.
dcRectifierOvertempAlarmCleared	Informational	141: Rectifier Overtemp alarm is no longer active in the DC power plant.
dcCurrentLimitAlarm	Warning	142: A Current Limit alarm is active in the DC power plant.
dcCurrentLimitAlarmCleared	Informational	143: Current Limit alarm is no longer active in the DC power plant.
dcRectifierFailAlarm	Warning	144: A Rectifier Fail alarm is active in the DC power plant.
dcRectifierFailAlarmCleared	Informational	145: Rectifier Fail alarm is no longer active in the DC power plant.
dcMultRectFailAlarm	Warning	146: Multiple Rectifier Fail alarm is active in the DC power plant.
dcMultRectFailAlarmCleared	Informational	147: Multiple Rectifier Fail alarm is no longer active in the DC power plant.
dcBatteryBreakerAlarm	Warning	148: Battery Breaker alarm is active in the DC power plant.
dcBatteryBreakerAlarmCleared	Informational	149: Battery Breaker alarm is no longer active in the DC power plant.
dcRectifierOVPAAlarm	Warning	150: A Rectifier OVP alarm is active in the DC power plant.
dcRectifierOVPAAlarmCleared	Informational	151: A Rectifier OVP alarm is no longer active in the DC power plant.
dcLVDImminentAlarm	Warning	152: An LVD Imminent alarm is active in the DC power plant.

Trap	Severity	Number and Description (Sheet 9 of 9)
dcLVDImminentAlarmCleared	Informational	153: An LVD Imminent alarm is no longer active in the DC power plant.
dcFuseCBAAlarm	Warning	154: A Fuse/CB alarm is active in the DC power plant.
dcFuseCBAAlarmCleared	Informational	155: A Fuse/CB alarm is no longer active in the DC power plant.
dcBatteryTestFail	Warning	156: A Battery Test failed in the DC power plant.
dcTemperatureAlarm	Warning	157: A Temperature alarm is active in the DC power plant.
dcTemperatureAlarmCleared	Informational	158: A Temperature alarm is no longer active in the DC power plant.
dcHumidityAlarm	Warning	159: A Humidity alarm is active in the DC power plant.
dcHumidityAlarmCleared	Informational	160: A Humidity alarm is no longer active in the DC power plant.
dcBBCommunicationEstablished	Informational	161: DC Power plant bridging board communications established.
dcBBCommunicationLost	Severe	162: DC Power plant bridging board communications lost.
iemHighTempThresholdViolation	Severe	163: High temperature threshold violation.
iemHighTempThresholdViolationCleared	Informational	164: High temperature threshold violation has been cleared.
iemLowTempThresholdViolation	Severe	165: Low temperature threshold violation.
iemLowTempThresholdViolationCleared	Informational	166: Low temperature threshold violation has been cleared.
iemHighHumidThresholdViolation	Severe	167: High humidity threshold violation.
iemHighHumidThresholdViolationCleared	Informational	168: High humidity threshold violation has been cleared.
iemLowHumidThresholdViolation	Severe	169: Low humidity threshold violation.
iemLowHumidThresholdViolationCleared	Informational	170: Low humidity threshold violation has been cleared.
iemProbeDisconnected	Warning	171: Probe has been disconnected.
iemProbeConnected	Informational	172: Probe has been connected.
iemContactFault	Severe	173: Contact fault.
iemContactFaultCleared	Informational	174: Contact fault cleared.
iemRelayFault	Warning	175: Output relay has faulted.
iemRelayFaultCleared	Informational	176: Output relay fault cleared.

Symmetra UPS Subtraps

The **abnormalCondition** and **abnormalConditionCleared** traps for the Symmetra UPS have the following subtraps that identify the abnormal condition.



Note:

To make the MIB forward-compatible with future UPS models, subtraps 41 through 64 are defined but unused at the time this manual is being published. If you use a new UPS model that was released after the publication of this manual, you could receive a subtrap for one of these subtrap numbers even if you have not upgraded the firmware for your Management Card. If this occurs, contact APC to obtain the latest MIB and TDF files, which will describe the newly defined bit.

Subtrap	Description	(Sheet 1 of 3)
SYMtrapstr1	An installed power module has failed.	
SYMtrapstr2	A failed power module condition has been corrected.	
SYMtrapstr3	An installed intelligence module has failed.	
SYMtrapstr4	A failed intelligence module condition has been corrected.	
SYMtrapstr5	An installed redundant intelligence module has failed.	
SYMtrapstr6	A failed redundant intelligence module condition has been corrected.	
SYMtrapstr7	An installed battery has failed.	
SYMtrapstr8	A failed battery condition has been corrected.	
SYMtrapstr9	The load is above the alarm threshold.	
SYMtrapstr10	The violation of the load alarm threshold has been corrected.	
SYMtrapstr11	The UPS has lost its redundancy.	
SYMtrapstr12	The loss of redundancy has been corrected.	
SYMtrapstr13	The redundancy of the UPS is at or below the alarm threshold.	
SYMtrapstr14	The redundancy of the UPS is above the alarm threshold again.	
SYMtrapstr15	The UPS is on bypass because input voltage and frequency were out of range.	
SYMtrapstr16	Input voltage and frequency are back in range. so the UPS returned from bypass.	
SYMtrapstr17	The bypass contactor is stuck in bypass position.	
SYMtrapstr18	The bypass contactor is no longer stuck in bypass position.	
SYMtrapstr19	The bypass contactor is stuck in the on-line position.	

Subtrap	Description
	(Sheet 2 of 3)
SYMtrapstr20	The bypass contactor is no longer stuck in the on-line position condition.
SYMtrapstr21	The UPS is in bypass mode due to an internal fault.
SYMtrapstr22	The internal fault condition that put the UPS into bypass mode has been corrected.
SYMtrapstr23	The UPS is in bypass mode due to an overload.
SYMtrapstr24	The overload condition that put the UPS in bypass mode has been cleared.
SYMtrapstr25	The UPS is in maintenance bypass mode.
SYMtrapstr26	The UPS is no longer in maintenance bypass mode.
SYMtrapstr27	The input circuit breaker has been tripped to the open position.
SYMtrapstr28	The tripped input circuit breaker has been reset.
SYMtrapstr29	A system level fan failure has occurred.
SYMtrapstr30	The system level fan failure has been corrected.
SYMtrapstr31	The redundant intelligence module is in control.
SYMtrapstr32	The redundant intelligence module is no longer in control.
SYMtrapstr33	A I2C failure occurred. (The UPS has an internal communication problem.)
SYMtrapstr34	The I2C failure condition (the internal communication problem) has been corrected.
SYMtrapstr35	A UPS battery is overheated.
SYMtrapstr36	The overheated battery condition has been corrected.
SYMtrapstr37	Load shutdown. AC input was lost while the UPS was in bypass.
SYMtrapstr38	The load shutdown condition has been corrected.
SYMtrapstr39	Remaining runtime is below alarm threshold.
SYMtrapstr40	Remaining runtime is above the alarm threshold again.
SYMtrapstr41	Bit 20 of the Abnormal Condition register is set.
SYMtrapstr42	Bit 20 of the Abnormal Condition register has been reset.
SYMtrapstr43	Bit 21 of the Abnormal Condition register is set.
SYMtrapstr44	Bit 21 of the Abnormal Condition register has been reset.
SYMtrapstr45	Bit 22 of the Abnormal Condition register is set.
SYMtrapstr46	Bit 22 of the Abnormal Condition register has been reset.
SYMtrapstr47	Bit 23 of the Abnormal Condition register is set.
SYMtrapstr48	Bit 23 of the Abnormal Condition register has been reset.

Subtrap	Description
	(Sheet 3 of 3)
SYMtrapstr49	Bit 24 of the Abnormal Condition register is set.
SYMtrapstr50	Bit 24 of the Abnormal Condition register has been reset.
SYMtrapstr51	Bit 25 of the Abnormal Condition register is set.
SYMtrapstr52	Bit 25 of the Abnormal Condition register has been reset.
SYMtrapstr53	Bit 26 of the Abnormal Condition register is set.
SYMtrapstr54	Bit 26 of the Abnormal Condition register has been reset.
SYMtrapstr55	Bit 27 of the Abnormal Condition register is set.
SYMtrapstr56	Bit 27 of the Abnormal Condition register has been reset.
SYMtrapstr57	Bit 28 of the Abnormal Condition register is set.
SYMtrapstr58	Bit 28 of the Abnormal Condition register has been reset.
SYMtrapstr59	Bit 29 of the Abnormal Condition register is set.
SYMtrapstr60	Bit 29 of the Abnormal Condition register has been reset.
SYMtrapstr61	Bit 30 of the Abnormal Condition register is set.
SYMtrapstr62	Bit 30 of the Abnormal Condition register has been reset.
SYMtrapstr63	Bit 31 of the Abnormal Condition register is set.
SYMtrapstr64	Bit 31 of the Abnormal Condition register has been reset.



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