



# Server Technology

Solutions for the Data Center Equipment Cabinet

**PIPS**

## Smart & Switched CDU<sup>®</sup> with PIPS<sup>™</sup> (Per Inlet Power Sensing)

If you manage a datacenter,  
we have a solution for you.

### *How do I...*

Monitor current, voltage, power (W), apparent power, crest factor, reactance, power factor and accumulated energy (kWh) per infeed or device?

Monitor W and kWh power information per outlet, device, application (groups of devices), cabinet, or location?

Provide kWh consumption and trends per outlet, device, application (groups of devices), cabinet or location?

Measure IT load for "green" efficiency metrics such as PUE from The Green Grid?

Monitor input current using accurate Digital True RMS current monitoring?



#### PIPS<sup>™</sup> Smart CDU<sup>®</sup>

Provides power monitoring per infeed/inlet to the CDU to monitor current, voltage, power (W), apparent power, crest factor, reactance, power factor and accumulated energy (kWh). Reliable Cabinet Power Distribution with Local Input Current Monitoring, Branch Circuit Protection and Enhanced Remote Power & Environmental Monitoring.

#### PIPS<sup>™</sup> Switched CDU<sup>®</sup>

Provides power monitoring per infeed/inlet to the CDU to monitor current, voltage, power (W), apparent power, crest factor, reactance, power factor and accumulated energy (kWh). A CDU with all of the features of the Smart product line plus Remote Management, including Reboot Commands (ON, OFF, REBOOT) to connected servers and network equipment.

#### Sentry Power Manager (SPM)

SPM is a powerful tool which allows monitoring, control capabilities, and management of multiple CDUs in single or multiple locations. Features include alarm management, reporting and trending of W and kWh information that can be used for energy efficiency calculations, device monitoring and consumption.

# CDU with PIPS Product Family

Power Distribution Solutions for the Data Center Equipment Cabinet



## Corporate Profile

Server Technology, Inc. is the global leader in power distribution units and power management products used in the world's leading enterprise data centers, service providers and branch office locations. For over 25 years, Server Technology has been recognized for innovative, intelligent power distribution, remote power monitoring and power management and measurement. Driven by customer innovation, the company is committed to helping companies reach their power consumption and green initiative goals.

Server Technology, Inc. is headquartered in Reno, Nevada with worldwide distribution and regional offices in the United Kingdom, Germany and Singapore. To contact Server Technology call +1.800.835.1515 or visit [www.servertech.com](http://www.servertech.com)

## Certifications, Compliance & Warranty

All products contained within this brochure carry one or more of the certifications below. Additional agency certifications are available based on specific market requirements.

- > US & Canada (cTUVus mark) to UL 60950-1:2003 and CAN/CSA 22.2 No. 60950-1-03
- > European Union (TUVGS mark) to EN 60950-1:2001
- > EMC – EN 55022 Class A, EN 55024
- > FCC Class A, Part 15
- > CE
- > 2 Year Warranty

## Feature Key

The Sentry PIPS Smart and Switched CDU product lines features the following assets:



### Flexible Mounting Options

Zero-U button or bracket mounting for mounting vertical CDUs in the back or on the side of the cabinet to avoid consuming valuable "U" space.



### Branch Circuit Protection

All Sentry CDUs meet the UL 60950-1 requirement for branch circuit protection and use either fuses or circuit breakers to protect each branch of outlets.



### Input Current Monitoring

The CDUs exclusive True RMS Current Monitoring is critical to preventing overloads in high-density computing environments. Digital LED displays on the CDU enclosure report the input current of each phase or branch circuit.



### Environmental Monitoring

External probes, with 3-meter cable, capable of measuring temperature & humidity. Receive SNMP-based or email alert notifications when conditions exceed defined thresholds.



### Expansion Module

Our exclusive method for linking additional outlets, on separate CDUs, together under a single IP address, providing support for A & B power in-feeds.



### IP Access, Security & Communications

Web interface, SSL, SSH, Telnet, SNMP and RS-232 access, 10/100 Base T-Ethernet, SSLv3/TLSv1, SNMPv2, TACACS+, LDAP, LDAPS, RADIUS, DHCP, SMTP/Email, and Syslog.



### Individual Outlet Control

Control individual outlets or groups of outlets with ON, OFF, and Reboot functionality to remotely reboot unresponsive servers and network equipment.



### PIPS™ (Per Inlet Power Sensing)

Monitor Current Load (A), Voltage (V), Power (W), Apparent Power (VA), Crest Factor, Reactance, Accumulated Energy (kWh), and Power Factor per inlet.



### Cable Retention Clip

Ensures power cords to the connected devices are not accidentally unplugged or disconnected.

# Smart & Switched CDU with PIPS

## Features and Anatomy

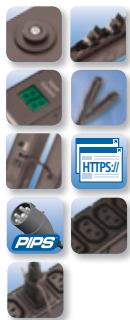
PIPS (Per Inlet Power Sensing) technology replaces power monitoring at the RPP (Remote Power Panel) in data centers with higher accuracy and lower cost monitoring of each power circuit attached to a CDU. This new product feature also replaces the already accurate Digital True RMS feature currently available on intelligent Smart, Switched and POPS CDUs by bringing more types of power measurements from the power infeed to the built in graphic user interface (GUI). Expect the same quality and functionality on current intelligent CDUs, but with an increased level of information to help you make the critical decisions regarding your facility.



### Sentry : PIPS™ Smart CDU®

Cabinet Power Distribution with Branch Circuit Protection, expanded functionality of SNMP-based Input Current and Environmental Monitoring

The Smart CDU products provide reliable power distribution coupled with remote power and environmental monitoring. Use the network interface to view power, temperature and humidity levels via Web browser, and receive SNMP-based and email alerts when conditions exceed defined thresholds. Smart CDUs with PIPS (Per Inlet Power Sensing) combine all of the features of a Smart CDU with the ability to provide power monitoring per inlet/infeed. Power information per infeed includes current, voltage, power, apparent power, crest factor, reactance, power factor and accumulated energy. This information replaces branch circuit monitoring devices typically installed in the power distribution panel or remote power panel (RPP) with higher accuracy and lower cost monitoring of each circuit attached to the CDU.

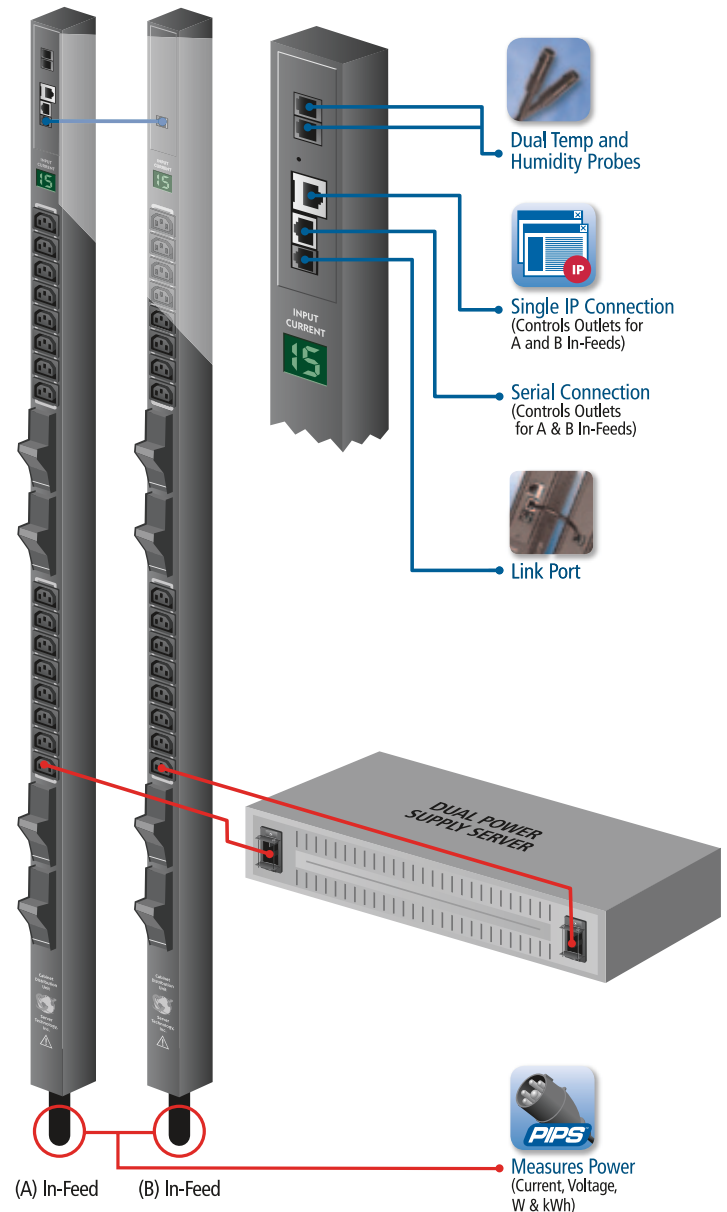


### Sentry : PIPS™ Switched CDU®

Cabinet Power Distribution with Branch Circuit Protection, expanded functionality of SNMP-based Input Current and Environmental Monitoring, and more...

The Switched CDU products provide the capability to securely monitor and control cabinet power via a network for a data center or remote branch office. The Switched CDUs combine networked configuration and management with power distribution and power and environmental monitoring. Reboot a single or dual power server with one command. Receive SNMP-based or email alerts when power or environmental conditions exceed thresholds. Assign access rights to user groups or individuals. Switched CDU products provide the flexibility needed for all data centers and remote sites, including power requirements for high-amperage and high-voltage, EN 60950-1:2001 Branch Circuit Protection, and SNMP traps and email alerts including current monitoring. Switched CDUs with PIPS allow the additional ability to provide power monitoring per inlet/infeed. Power information per infeed includes current, voltage, power, apparent power, crest factor, reactance, power factor and accumulated energy. This information replaces branch circuit monitoring devices typically installed in the power distribution panel or remote power panel (RPP) with higher accuracy and lower cost monitoring of each circuit attached to the CDU.

Diagram 1  
Monitoring & Outlet Control





# Smart & Switched CDU with PIPS

Access, Security and Communications



## PIPS Smart & Switched CDU

### Integral Web Interface

The Sentry PIPS CDU is capable of being accessed through either a secure network or serial connection. The secure integral web interface provides a simple and easy way to configure the CDU. Configuration choices include: SNMP traps, email alerts, grouping, and all security and communication settings.

### Features

- > Simple, secure, integral web interface GUI configuration tool
- > Temperature and humidity support
- > Authentication logging, configuration changes and system events
- > Secure Syslog protocol support
- > Email notifications of log, event, authorization, power and configuration messages
- > Automatic firmware updates via FTP server
- > Strong password support and pre-login banner
- > Ability to ping an IP address to see if the device is responding
- > Grouping of outlets across multiple CDUs
- > SNMP: Traps based on status, changes, load, temperature and humidity
- > Supports 104 user accounts and 18 simultaneous logins with a dedicated SNMP connection

### Communication Tools

- > Web Interface
- > RS-232 access
- > 10/100 Base-T Ethernet
- > SMTP/Email
- > Telnet
- > SSH
- > SSLv3/TLSv1
- > SNMPv2
- > TACACS+
- > LDAP
- > LDAPS
- > RADIUS
- > DHCP
- > Syslog

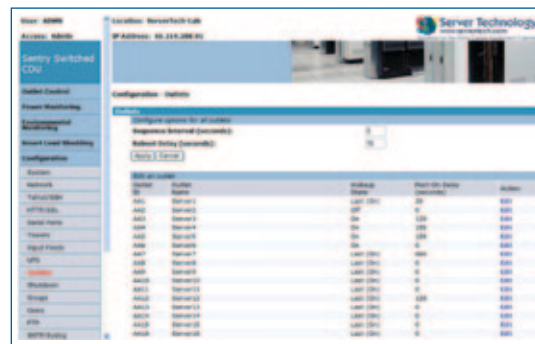
## Power Information & Management

### Internal Web Interface



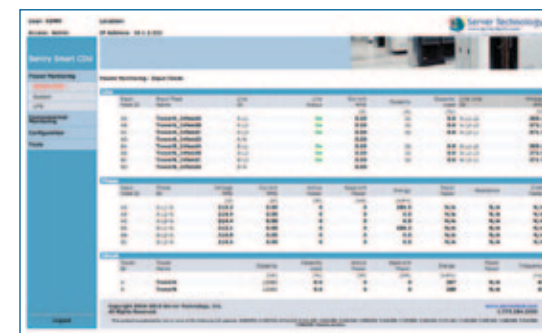
### System Configuration

Intelligent CDUs enable network access to remotely configure access, outlets, alarms, thresholds, and more.



### Outlet Control

Control outlets on Switched CDUs (ON, OFF, REBOOT). Group Outlets based on: device, group of devices, cabinet (single IP address supports master & expansion CDU), or individual CDU.



### Sentry PIPS (Per Inlet/Infeed Power Information)

- > Current (Amps)
- > Voltage (Volts)
- > Power (Watts)
- > Apparent Power (VA)
- > Power Factor
- > Accumulated Energy (kWh)
- > Neutral Current: Measures neutral current



### Environmental Monitoring

No additional IP address needed to obtain temperature and humidity readings.

# Smart & Switched CDU with PIPS

## Power Management Architecture

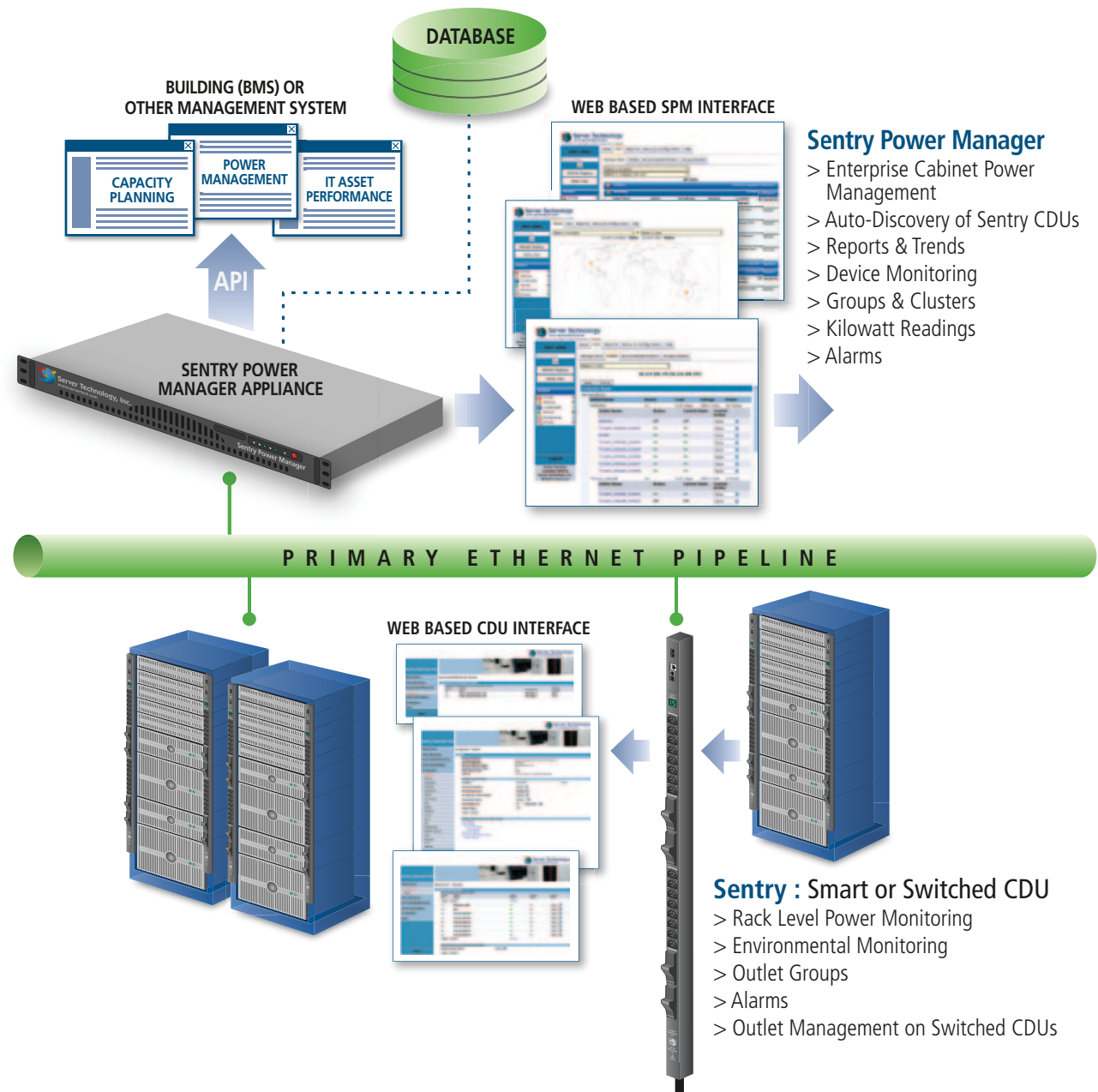
### Power Information & Management

#### Sentry Power Manager

The Sentry Smart and Switched CDUs are capable of being monitored through the SPM (Sentry Power Manager) tool. Sentry intelligent CDUs, in conjunction with SPM, provide additional power information for consumption purposes and power monitoring as well as trending and power reports. An API allows power and other information to be communicated to a Building Management System (BMS) or other systems.

#### Sentry Power Manager (SPM) Solutions

- > SPM provides a global view of all Sentry CDUs with the ability to view devices based on their temperature, humidity, current and device status. Quickly drill down from global view to your facility maps to an individual CDU.
- > Manage and monitor all user-defined alarm conditions on your entire network.
- > Group and cluster outlets for remote reboot, power measurement information across a single CDU, a linked CDU, or across the entire network.
- > Allows measurement of power consumption and capacity planning.
- > Auto-discover all your CDUs connected to your IP network.
- > View Logs for user access, discovery, user actions, and alarms.
- > Multiple user levels and permissions including support for LDAP.
- > Control individual outlets on Switched CDUs.
- > Report and trend circuit/inlet power information directly at the CDU



# Smart & Switched CDU with PIPS

## Sentry Power Manager (SPM)

### Sentry Power Manager

#### Manage Multiple CDUs Across Multiple Locations

Do you have multiple Sentry CDUs in one or more locations that you would like to access from one central point? Would you like one central location where all alarms can be viewed and logged for reporting, e-mail or SNMP trap notifications? No problem! Our Sentry Power Manager (SPM) product is capable of monitoring and managing multiple Sentry devices in IP-based enterprise networks. SPM provides a global view of all Sentry CDUs with the ability to view devices based on their temperature, humidity, current and device status. Besides managing and monitoring all alarm conditions, this information can also be used to provide reporting and trending information for display within SPM or integrated with your existing Building Management System (BMS).

#### Event Notification

- > Email notification via the CDU or SPM to multiple recipients when an event occurs
- > SNMP traps via the CDU or SPM when an event occurs
- > Auto-discovers each CDU for easy configuration
- > Easily create a user interface that mirrors the physical deployment of the data center
- > Quickly drill down from a global perspective to the rack's actual physical location if there is a problem (quickly identify the alarm and the physical location of the CDU)
- > Create outlet clusters to group outlets within a CDU, across linked CDUs or across enterprise locations

#### Multiple Reporting Options

- > Reporting capabilities to produce reports on critical management parameters such as temperature, humidity and current load
- > Reports on current and power providing the power consumption of each input, total for the rack and/or per square foot of the rack

#### On-Demand Accessibility

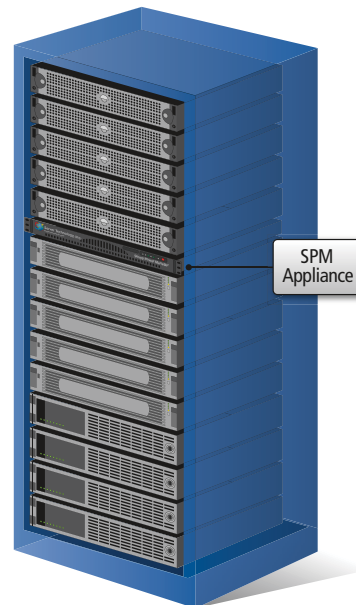
- > Real-time view of all active system alarms
- > Anytime, anywhere web-based views
- > Manage thousands of CDUs from a single console

#### Compatibility

- > Server Technology Sentry CDUs with firmware 5.3+

#### Web Browsers Supported

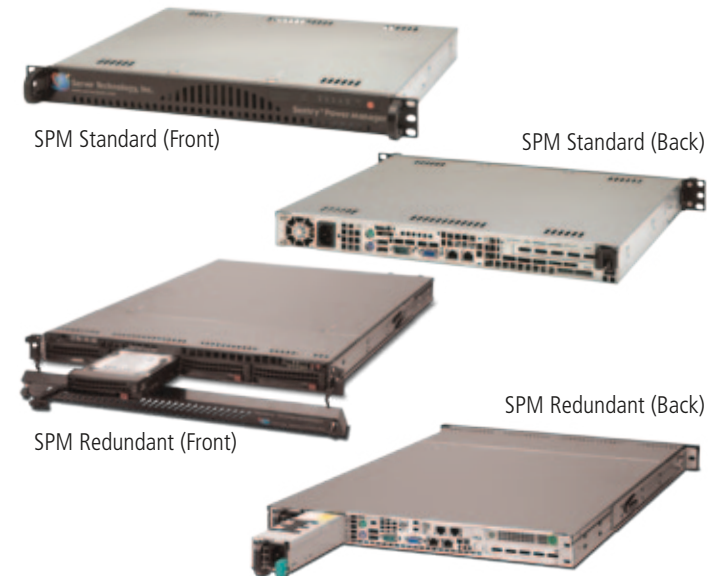
- > Microsoft Internet Explorer 7.0+
- > Mozilla Firefox 2.0+



Web Based GUI: Quickly drill down from a global view to the rack level

#### Rack Mount SPM Appliances

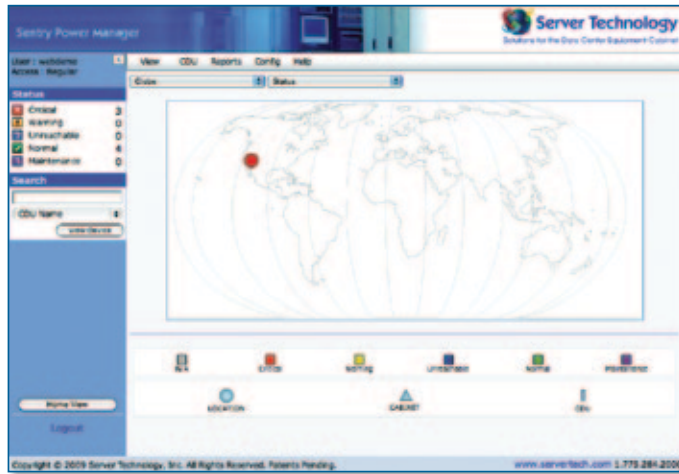
1U SPM standard and 1U SPM redundant appliances.





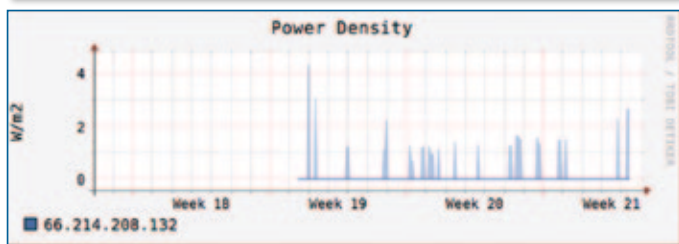
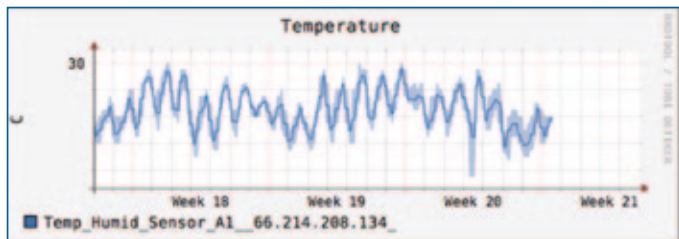
# Smart & Switched CDU with PIPS

Sentry Power Manager and Expansion Modules



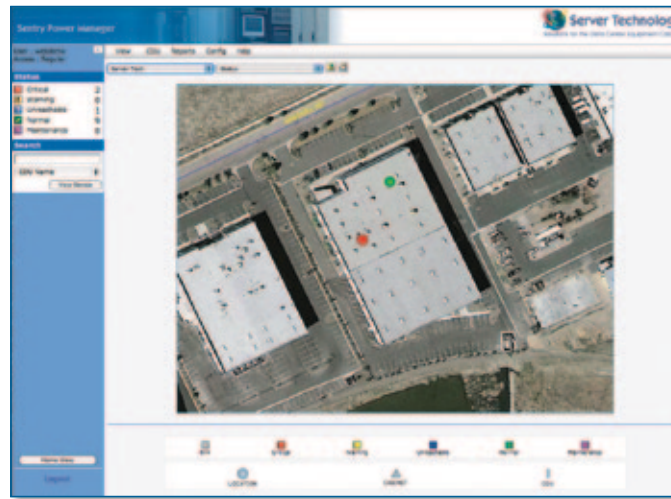
## Home Page

- > Multiple Views per status, power, temperature, humidity & capacity
- > Alarm status
- > Search box



## Trends

- > Power, temperature and humidity
- > Select up to 10-items
- > Period: 24-hours to 3-years



## Views

- > Environmental, power, and capacity information
- > Power density
- > Status

Date/Time	Status	IP Address	Location (Datacenter)	ASL Serial Number
2009-08-17 18:12:00	Warning	66.214.208.132	66.214.208.132	6007180
2009-08-17 18:12:00	Warning	66.214.208.134	66.214.208.134	6007180
2009-08-17 18:12:00	Warning	66.214.208.91	66.214.208.91	6007180
2009-08-17 18:12:00	Warning	66.214.208.92	66.214.208.92	6007180
2009-08-17 18:12:00	Warning	66.214.208.93	66.214.208.93	6007180
2009-08-17 18:12:00	Warning	66.214.208.94	66.214.208.94	6007180
2009-08-17 18:12:00	Warning	66.214.208.95	66.214.208.95	6007180

## Alarm Details

- > CDU to maintenance mode
- > View and control CDU
- > Overview and detailed alarm information

## Linkable Expansion Module

The Expansion Module CDU, Smart CL or Switched CX, is our exclusive method for linking together outlets on different power circuits.

The Expansion Module CDU, CL or CX, increases the number of managed outlets on a single IP address. Each expansion module links to its parent Smart CS or Switched CW, which contains both network and serial interfaces. When linked to a Smart or Switched CDU, the CL's or CX's outlets are auto-discovered by the Smart or Switched CDUs firmware, and all available outlets are viewable through the firmware.

On the Switched CW, outlets are individually controllable, or groups of outlets can be controlled between the Switched CW and CX with one command. Each Expansion Module CDU can be a single or dual-power feed and have a Zero-U or horizontal enclosure.

A-Feed (CS/CW) B-Feed (CL/CX)



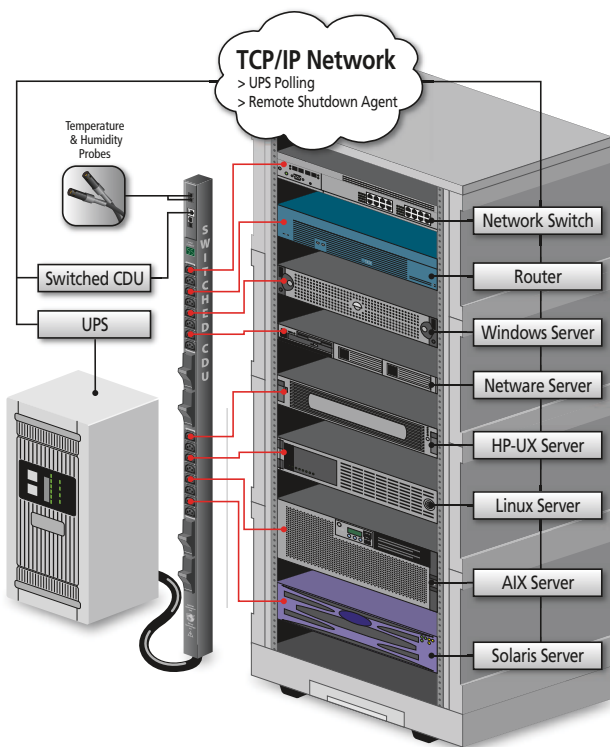
# Smart & Switched CDU with PIPS

## Smart Load Shedding and Integral Network Administration Interface

### Sentry Smart Load Shedding

Load Management based on Temperature, In-feed Load, and UPS Status

Server Technology is the first to offer datacenter managers the ability to automatically manage Switched CDU power outlets based on key operating parameters, including temperature, in-feed load, and UPS power status. Each outlet may be controlled by one or more of these parameters. Should the temperature or load current exceed defined thresholds or the UPS lose power and go onto battery, all or a portion of the loads may be automatically shed to ensure longer operational life of your critical devices.

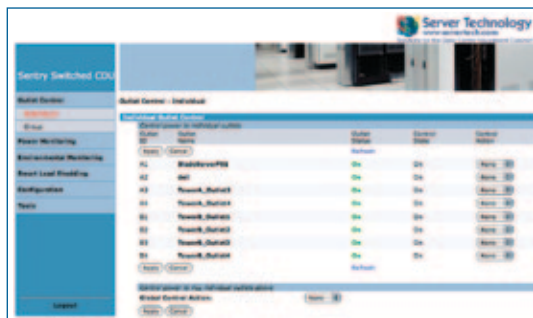


#### Features

- > Easy to use, integral, web based GUI configuration tool
- > "Auto-recovery" with a reboot delay time when conditions return to normal
- > Each CDU outlet is assigned the IP address of the connected device for shut down notification
- > Remote shutdown agent for server shut down
- > SNMP trap notifications
- > Load shedding event notifications via SNMP traps or Email alerts

### Sentry Access, Security & Communication

#### Integral Web Interface



Web Based GUI: Individual Outlet Control Screen



Web Based GUI: System Configuration Screen



Web Based GUI: Environmental Monitoring Screen

#### Features

- > Secure, web based GUI configuration tool
- > Temperature support (celsius/fahrenheit) and humidity (%)
- > Logs authentications, configuration changes and system events
- > SNMP and email notifications for multiple users of log, event, power, and authorization, configuration messages
- > Syslog logging protocol support
- > Automatic firmware updates via FTP
- > Strong password support and pre-login banner

#### Power Information

- > Input Feed Voltage (VAC)
- > Input Feed Watts (W)
- > System Total Watts (W)
- > System Footprint (SqFt / SqM)
- > System Watts/Area (W/SqFt / W/SqM)

#### Communication Tools

- > Web interface, SSL, SSH, Telnet, SNMP & RS-232 access, 10/100 Base T-Ethernet, SSLv3/TLSv1, SNMPv2, TACACS+, LDAP, LDAPS, RADIUS, DHCP, SMTP/Email, and Syslog.

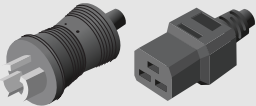
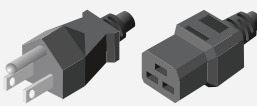
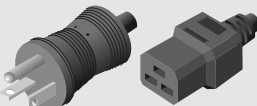
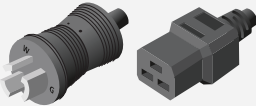




# Smart & Switched CDU with PIPS


## Plug and Cord Options for Sentry CDUs

Server Technology provides 20A, 30A, and 60A products with a variety of input cord options available. Please refer to the Power Cords and cordset options below for different configurations. Shown below are standard power cord and cordset options.<sup>1 2</sup>

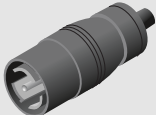

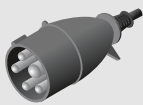
### 20A Plugs & Cords

Model	PTCORD-1	PTCORD-5	PTCORD-6	PTCORD-7	Hard-Wired	Hard-Wired
Outlets	NEMA L6-20P to IEC 60320/C19	NEMA 5-15P to IEC 60320/C19	NEMA 5-20P to IEC 60320/C19	NEMA L5-20P to IEC 60320/C19	NEMA L15-20P	NEMA L21-20P
Voltage (V)	208-240V	100-120V	100-120V	100-120V	3-Phase 208V, Delta	3-Phase 208V, Wye
Amps (A)	20A	15A	20A	20A	20A	20A
Length	10'   3m	10'   3m	10'   3m	10'   3m	10'   3m	10'   3m
						

### 30A Plugs & Cords

Model	Hard-Wired	Hard-Wired	Hard-Wired	Hard-Wired	Hard-Wired
Outlets	NEMA L5-30P	NEMA L6-30P	NEMA L15-30P	NEMA L21-30P	NEMA L22-30P
Voltage (V)	100-120V	208-240V	3-Phase 208V, Delta	3-Phase 208V, Wye	277/480V, Wye
Amps (A)	30A	30A	30A	30A	30A
Length	10'   3m	10'   3m	10'   3m	10'   3m	10'   3m
					

### 50A & 60A Plugs & Cords

Model	Hard-Wired	Hard-Wired	Hard-Wired
Outlets	CS8365C	IEC 60309 (4pin, 9hr)	IEC 60309 (5pin, 9hr)
Voltage (V)	3-Phase 208-240V	3-Phase 208-240V, Delta	3-Phase 208V, Wye
Amps (A)	50A	60A	60A
Length	Varies Based on Model	Varies Based on Model	Varies Based on Model
			

<sup>1</sup>Server Technology offers a wide range of products for North America and global markets. For more information on global products visit our website at [www.servertech.com](http://www.servertech.com) <sup>2</sup>Custom cable lengths available; contact a Server Technology Power Expert to determine the correct solution.

# Smart & Switched CDU with PIPS

## Zero-U Vertical Enclosures

Model	CS-24V2-C1	CS-24VE-C1	CS-36V4-A4C	CS-36V5-A4C	CS-48VD/Y-A1
Outlets	(18) C13 + (6) C19	(18) C13 + (6) C19	(24) C13 + (12) C19	(24) C13 + (12) C19	(36) C13 + (12) C19
Input Voltage (V)	208V	230V	3-Phase 230/400V	3-Phase 240/415V	3-Phase 208V
Amps (A)	20A or 30A	16A or 32A	16A or 32A	20A or 30A	50A or 60A
Cabinet kW	4.2kW or 6.2kW	3.6kW or 7.3kW	11kW or 22kW	14.4kW or 21.6kW	18kW or 21.6kW
Output Voltage (V)	208V	230V	230V	240V	208V
Dimensions	36U   63.1"   1604mm	36U   63.1"   1604mm	42U   73.5"   1867mm	42U   73.5"   1867mm	40U   69"   1753mm



# Smart & Switched CDU with PIPS

Zero-U Vertical Enclosures

Model	CW-24VD-A9
Outlets	(12) C13 + (12) C19
Input Voltage (V)	3-Phase 208V-240V
Amps (A)	50A or 60A
Cabinet kW	18kW or 21.6kW
Output Voltage (V)	208-240V
Dimensions	43U   75.8"   1926mm



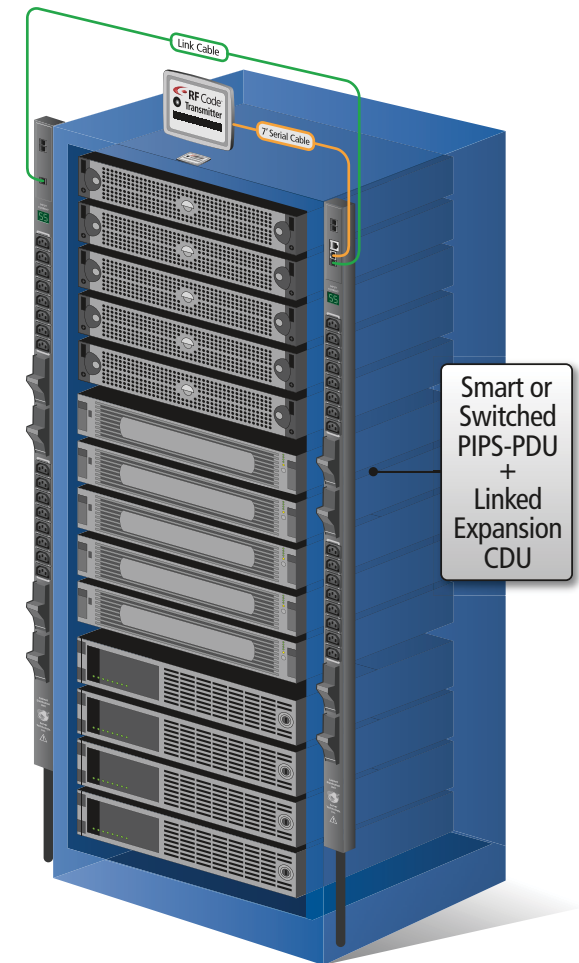
## Introducing the Wire-Free Power Monitoring Solution for Data Center Energy Optimization



Server Technology and RF Code, a leading provider of active IT asset

management and environmental monitoring solutions, have jointly developed a rack level wire-free power monitoring solution.

The jointly developed solution integrates Server Technology's Smart and Switched CDUs with patented Per Inlet Power Sensing (PIPS™) with RF Code's active RFID hardware and management software. This solution allows RF Code sensor tags to capture and then transmit power monitoring in-feed and device level data (with POPS™) from the Server Technology CDUs, to the RF Code wire-free active reader infrastructure. Readers then send the information to RF Code's Sensor Manager software, which manages the power monitoring information.







**HEADQUARTERS - NORTH AMERICA**

**Server Technology, Inc.**  
1040 Sandhill Drive  
Reno, NV 89521  
United States  
+00 (1) 775 284 2000 Tel  
+00 (1) 775 284 2065 Fax  
sales@servertech.com  
www.servertech.com  
www.servertechblog.com

**EMEA**

**Server Technology Intl.**  
Sienna Court  
The Broadway  
Maidenhead  
Berkshire  
SL6 1NJ  
United Kingdom  
+44 (0) 1628 509053 Tel  
+44 (0) 1628 509100 Fax  
salesint@servertech.com

**APAC**

**Server Technology, Inc.**  
37th Floor, Singapore Land Tower  
50 Raffles Place  
Singapore 048623  
+65 (0) 6829 7008 Tel  
+65 (0) 6234 4574 Fax  
salesint@servertech.com