RACK POWER DISTRIBUTION FOR CRITICAL IT EQUIPMENT

Rack PDU Solutions
Enhanced Performance And Management Of Dynamic IT Spaces

Enhance Business Agility, Efficiency and Availability with Vertiv™ Rack PDUs.

Data center investments are sizable, and each component of the power chain—from the building entrance to the rack power distribution—is crucial to enabling equipment availability. Enable your IT investment—and your business—to stay protected with Vertiv’s family of rack PDU offerings.

Vertiv’s next generation of rack PDUs provides the industry’s highest availability and most intelligent power metering and distribution—complete with the simplified energy management, modular design and cost savings that ensure your data center—and your business—can operate at peak velocity and resiliency.

Our complete portfolio of rack PDUs offers value beyond power distribution. They easily integrate to your data center infrastructure management systems to make your organization more resilient, enhance your business velocity and provide the technological support you need to grow your company.

MPX and MPH2 Rack PDUs

*Intelligent, real-time infrastructure*
- Communicate the status of rack-level power and environmental information to a centralized Data Center Infrastructure Management (DCIM)
- Allow monitoring and control to the receptacle level

*Optimized level of visibility and control*
- Provides the information needed to make informed decisions and enhance business agility

The exclusive Distribution Assurance Package offers lifecycle service and support from a trusted OEM service partner for your rack PDUs, ensuring system availability.

- Available with Vertiv MPH2™, MPX™, and Knürr DI-STRIP rack PDUs
- Startup and installation services
- OEM expertise
- 5-year protection plan
- 24x7 on-site emergency response
- Parts and labor coverage
- Optional removal and disposal
How You Benefit from Vertiv™ Rack PDUs

**DESIGNED FOR HIGH AVAILABILITY**

Vertiv rack PDUs are designed specifically to accommodate higher power densities and be resistant to higher temperatures, commonly found in modern data center racks. System is designed to optimize basic power availability. They are easily upgradable to minimize downtime and carry manufacturer-provided support to ensure your own SLAs.

- High temperature rating
- Modular hot swappable controller card
- 100% rated magnetic hydraulic circuit breakers
- MPX™ rack PDU system-modular, adaptive design
- Bistable / normally closed relays

**OPTIMIZED ENERGY AND CAPACITY MANAGEMENT**

By providing highly accurate and comprehensive energy metering from the aggregate to receptacle levels, MPX and MPH2™ rack PDUs provide visibility to control energy usage by IT equipment, right-size your power infrastructure and eliminate unnecessary capital expense. These rack PDUs also have the lowest energy consumption in this category.

- Metering of key electrical parameters with +/-1% accuracy
- Lowest PDU power consumption in the industry of all switched rack PDU's
- Power and environmental trend reports through several Vertiv DCIM solutions

**SIMPLIFIED INTEGRATION WITH MANAGEMENT TOOLS**

MPX and MPH2 rack PDUs offer a simplified approach to implementation and change management that translates to real cost savings and operational advantages. They support all major industry-standard management, authentication and encryption standards and protocols, and they fully integrate into Vertiv’s industry-leading KVM, serial console and infrastructure management systems. Plus, they integrate rack level power and environmental monitoring information from the rack PDUs with higher level data center management software provided by Vertiv or third parties.

- Up to 4 units sharing an IP address within Rack PDU Array™
- Integration with Vertiv KVM, serial console and infrastructure management appliances and software
- Integration with Vertiv software stack (e.g DSView™, etc.).
- IPv6 support
- Support of remote authentication protocols (LDAP, Active Directory, Radius, Kerberos, TACACS+) and encryption

**COMPATIBILITY WITH RACKS AND POWER CHAIN**

Deployable in most industry racks, Vertiv rack PDUs are simple to install and move. When Vertiv racks are purchased, the rack PDUs may be pre-installed to save time and cut costs. All major global voltage and amperage combinations typically used in a data center or remote site are available—a Vertiv expert can assist in selecting the right rack PDU for your power chain needs.

- Ability to be preinstalled in Vertiv rack solutions
- Available in popular voltage and amperage combinations
RACK PDU SOLUTIONS

**MPX™ - Adaptive Rack PDU: Respond To Change While Watching Your Bottom Line**

Confidently take on the uncertain future of connected power requirements with MPX, the most responsive and adaptive rack PDU available. With MPX rack PDU technology, you can respond to rack equipment changes and dynamic capacities by leveraging:

- Hot-swappable modular output power
- Hot-swappable modular communications
- Modular input power

**MPX Benefits:**

- Adaptive capacity, distribution, monitoring, control and management of critical devices
- Flexibility to respond to constant change—redeploy modules to suit changing needs
- Buy only what you need and build on your investment
- Secure communication

**Reconfigurable Power Capacity & Distribution**

The MPX rack PDU has a scalable design that allows onsite configuration to fit immediate IT equipment needs. It is the perfect choice to respond to the needs of a growing data center. Relocate or add IT equipment to support changing needs, by easily reconfiguring the power input and distribution.

**Fits Needs Now And Later**

The MPX rack PDU provides a wide selection of single phase and three-phase power input configurations—with the ability to field change while maintaining distribution infrastructure.

**Designed for Critical Environments**

- Critical rack space operating temperature—up to 55°C / 131°F to support hot internal rack environments
- Accurate power metering of +/-1% voltage & current for assured oversight
- Energy and power metering down to the individual receptacle
- Comprehensive alarming including notification of overloaded branch circuits
- Environmental sensing with threshold and alarm set-points
- Notification on the loss or removal of individual rack equipment loads

**Modular Input Power**

- May be reconfigured to support changing power needs, single and three phase input
- Can be positioned for top or bottom rack entrance

**Hot Swappable Output Power** deploy easily to get IT equipment online quickly

**Receptacles & Modules** may be remotely controlled and metered, providing operator flexibility and allowing increased site security
**Power Rail Chassis (MPX PRC)** distributes power and communications to all of the support modules. Available in two separate heights to accommodate varying rack heights.

**Power Rail Spacer** reserves the unused space until an MPX module is needed.

**Branch Receptacle Modules (MPX™ BRM)** provide output power and branch circuit over protection. Elementary, branch metered and outlet metered & switched versions available.

**Power Entry Module (MPX PEM)** available in variable capacity and fixed capacity versions.

**MPX PEM fixed capacity module** for 3-phase applications. Detachable power cord supports changing input power requirements.

**MPX PEM variable capacity module**, for 1 or 3 phase applications. Detachable power cord supports changing input power requirements.

**SN Sensors**: consolidate environmental monitoring of temperature and humidity with rack level power.

**BDM™ local display module**, advanced diagnostics, displayed at a location that is convenient for the customer. Features include specific information on alarms, specific labels for outlets.

**Communications Module (RPC2)** mounts in the Power Entry Module and provides upgradable network communications, sensor and local display interface.
RACK PDU SOLUTIONS

MPH2™—Managed Rack PDU: Advanced Monitoring And Control Support

MPH2 is the most intelligent, high-availability line of managed rack PDUs. It offers remote monitoring and control capabilities as well as environmental input options, with multiple power input selections and output configurations.

The MPH2 is available in 0U, 1U and 2U form factors. Models are also available in the following four versions:
- Outlet Level Metered and Switched
- Outlet Level Metered
- Rack PDU Metered and Outlet Switched
- Rack PDU Metered

MPH2 Benefits
- Monitors electrical and environmental parameters with set threshold and alarm tools
- Controls and manages individual receptacles and/or groups of loads and devices
- Allows you to predict failing conditions before they occur and proactively manage connected equipment for maximum uptime
- Energy and power metering to maximize the data center power and cooling infrastructure
- Lowest power consumption of all switched rack PDU designs ensures lower operating costs for datacenter
- Up to four MPH2 rack PDUs may be interconnected as a Rack PDU Array™, consolidating user IP connections and device monitoring
- Designed for Critical Environments
  - Industry leading operating temperature —up to 60°C / 140°F to support hot internal rack environments
  - Bi-stable relays ensure basic power distribution in the event that intelligence is compromised
  - Accurate power metering of +/−1% voltage & current for assured oversight
  - Energy and power metering down to the individual receptacle
  - Comprehensive alarming including notification of overloaded branch circuits
  - Environmental sensing with threshold and alarm set-points
  - Notification on the loss or removal of individual rack equipment loads

MPH2 Savings for a Typical Data Center

<table>
<thead>
<tr>
<th></th>
<th>TYPICAL 24 OUTLET RACK PDU</th>
<th>MPH2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack PDU power consumption (Watts)</td>
<td>23</td>
<td>7.5</td>
</tr>
<tr>
<td>Rack PDU annual energy consumption (kWh) —24x7x365</td>
<td>202</td>
<td>66</td>
</tr>
<tr>
<td>Overall contribution to datacenter energy consumption (kWh)*</td>
<td>383</td>
<td>125</td>
</tr>
<tr>
<td>Cost of energy consumption (based on average cost of 10c/kWh)</td>
<td>$38</td>
<td>$13</td>
</tr>
<tr>
<td>Annual savings per pdu with MPH2</td>
<td></td>
<td>$26</td>
</tr>
<tr>
<td>Annual savings per rack with MPH2</td>
<td>$52</td>
<td></td>
</tr>
<tr>
<td>Annual savings within the datacenter with MPH2</td>
<td>$5,160</td>
<td></td>
</tr>
</tbody>
</table>

Based on a comparison of switched rack PDU models for a typical 100 rack data center with a PUE of 1.9.
*per Energy Logic calculations
Corded and hardwired options: provide flexibility of wiring to both overhead and raised floor power distribution

Flexible power cord entry: Simplifies installation of higher amperage units

BDM™ local display module: Advanced diagnostics, displayed at a location that is convenient for the customer. Features include specific information on alarms, specific labels for outlets

Onboard display: Provides easy access to vital information at the rack

Communications Module (RPC2™): Provides upgradable network communications, sensor and local display interface

SN Sensors: consolidate environmental monitoring of temperature and humidity with rack level power

Locking outlets and locking power cord: Prevents accidental unplugging of IT devices

Slim profile breakers: 100% rated hydraulic magnetic slim profile. CB's provide reliable resettable branch circuit protection without nuisance tripping

Also available in 1U and 2U models
**Seamless DCIM Manageability and Integration**

MPH2™ and MPX™ intelligent rack PDUs can be managed both locally and remotely. Metering of all electrical information down to the outlet, phase, bank or rack PDU level as well as integration with environmental sensors makes these rack PDUs the backbone of rack level power consumption and environmental information. Support for all major industry-standard management, authentication and encryption standards and protocols ensures that these products seamlessly fit into any existing network and security architecture.

**Flexible Local & Remote Management**

**The MPH2 standard onboard display** provides all pertinent information required at the rack. The optional BDM local display is available for MPH2 or MPX, and provides flexibility in location of the display for most convenient visibility.

**Remote communications** at a rack PDU level is enabled by the modular, hot swappable RPC2™ card, providing seamless upgradeability and serviceability. RPC2 enables:

- **Support up to 4 PDUs within a Rack PDU Array™**: Minimizes IP addresses
- **Support up to 10 environmental sensor probes**: Consolidated rack level power and environmental monitoring
- **Support for Web UI, CLI, SSH and Telnet**: Provides Windows, Linux and network administrators their preferred way to interact with the rack PDU
- **Support for all major remote authentication & encryption protocols**: Ensures seamless integration into any corporate security architecture
- **SNMP v1, v2 and v3 support**: Ensures secure communications through network management systems
- **IPv4 and IPv6 support**: Ensures continued IP support for rack PDUs
- **Embedded data log**: Enables equipment or rack level baseline power consumption study
- **Embedded event log**: Easier troubleshooting and auditing

**Remote monitoring interface** capabilities include:

- Snapshot of all electrical parameters at outlet, branch, phase and aggregate level
- Snapshot of environmental sensor readings and status, including temperature, humidity, and leak detection.
- Threshold configuration, alarm creation and notifications
- Power control of individual or group of outlets
- Status information and configuration of all outlets
- Network management settings

**Centralized Management** of all rack PDUs within a datacenter is provided by **Avocent® Rack Power Manager**

- Centralized power consumption and environmental reports at all levels within datacenter
- Centralized power control of individual or group of outlets
- Mass configuration capabilities
- Centralized authorization, authentication and auditing of all rack PDUs and pertinent data

![Command Line Interface](image1)

![Web User Interface](image2)

![Avocent Rack Power Manager](image3)
Leveraging Your Rack PDU Investment

MPX™ and MPH2™ rack PDUs fully integrate into Vertiv™’s industry-leading KVM, serial console and infrastructure management systems. Plus they integrate rack level power and environmental monitoring information from the rack PDUs with higher level data center management software provided by Vertiv or third parties. By making the information available through these intelligent rack PDUs easily consumable, Vertiv ensures that customers invest in a comprehensive, easy to use power distribution and management solution.

Integration with Avocent® Advanced Console Server, MergePoint™ Unity KVM Switches ensures:
- Out of band management path for rack PDUs
- Rack PDUs are a part of consolidated rack level access and control solution
- Minimize the number of IP addresses required for rack PDU management

Integration with Avocent DSView4™ software ensures:
- Rack PDUs are a part of consolidated datacenter level access and control solution
- Easy association of IT equipment with the rack PDU outlets they are connected to
- Rack PDUs are a part of consolidated authentication, authorization and audit solution for datacenters

Integration with Liebert® Nform™ and Liebert SiteScan® ensures:
- Rack PDUs are a part of consolidated facilities level monitoring solution for datacenters
- Real-time monitoring and control of virtually any piece of critical support equipment
- Data analysis and trend reporting
- Event management

Integration with the Trellis™ platform and Universal Management Gateway appliances ensures that rack PDUs are a part of a comprehensive DCIM solution that includes:
- Inventory Management of all IT and facilities assets
- Monitoring of all facility critical devices and serviceprocessor-enabled IT devices
- Capacity & Change Management
- Energy Consumption Management
- Power System Management
DI-STRIP®: Most robust and comprehensive line of basic rack PDUs in easy to use configurations.

Basic Rack PDUs are the right answer for data center users selecting robust, economical and flexible rack power solutions. DI-STRIP rack PDUs meet a broad range of power distribution requirements for IT and other applications. Designed especially to handle the growing number of electronic components that can be housed within network cabinets and server racks, the space saving product line is available in a range of configurations.

- Flexibility with multiple configurations and input power options
- Critical rack space operating temperature—up to 55°C / 131°F to support hot internal rack environments
- Simple and quick installation on the rack's extrusion requires minimal space
<table>
<thead>
<tr>
<th><strong>Mounting</strong></th>
<th><strong>MPX™</strong></th>
<th><strong>MPH2™</strong></th>
<th><strong>DI-STRIP®</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Preinstalled Toolless brackets, Universal Mounting bracket, Ability to ship rack PDU preinstalled in Vertiv™ Racks</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>Input Power Options</strong></th>
<th><strong>North America</strong></th>
<th><strong>International</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North America</strong></td>
<td>100 - 120V 1-ph 20A/30A</td>
<td>100 - 120V 1-ph 15/20/30A</td>
</tr>
<tr>
<td></td>
<td>200 - 240V 1-ph 20A/30A</td>
<td>200 - 240V 1-ph 20A/30A</td>
</tr>
<tr>
<td></td>
<td>208/120V 3-ph 20A/30A</td>
<td>230V 1-ph 16A/32A</td>
</tr>
<tr>
<td></td>
<td>415V/240V 3-ph 20A/30A</td>
<td>230/400V 3-ph 16A/32A/63A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Input Power Options International</strong></th>
<th><strong>North America</strong></th>
<th><strong>International</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North America</strong></td>
<td>100 - 120V 1-ph 15/20/30A</td>
<td>230V 1-ph 16A/32A</td>
</tr>
<tr>
<td></td>
<td>200 - 240V 1-ph 20A/30A</td>
<td>230V 1-ph 16A/32A</td>
</tr>
<tr>
<td></td>
<td>200 - 240V 3-ph 20/30/50/60A</td>
<td>230V 1-ph 16A/32A</td>
</tr>
<tr>
<td></td>
<td>20/120V 3-ph 20/30/3A</td>
<td>230/400V 3-ph 16A/32A/63A</td>
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</tbody>
</table>

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<thead>
<tr>
<th><strong>Input Wiring Options</strong></th>
<th>10 ft. pluggable power cord</th>
<th>10 ft. pluggable power cord or Hardwired</th>
<th>8/10 ft. pluggable power cord</th>
</tr>
</thead>
</table>

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<thead>
<tr>
<th><strong>Max. Capacity North America</strong></th>
<th>17.2 kW</th>
<th>17.2 kW</th>
<th>4.9 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max. Capacity International</strong></td>
<td>22.7 kW</td>
<td>22.2 kW</td>
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<tr>
<td><strong>Outlet Options</strong></td>
<td>NEMA 5-20; IEC 320C13; IEC 320 C19; Schuko; French UTE; Schuko; Switzerland CH SEV</td>
<td>NEMA 5-20; IEC 320C13</td>
<td>NEMA 5-15; NEMA 5-20; IEC 320C13; IEC 320 C19; French UTE; Schuko; Switzerland CH SEV</td>
</tr>
<tr>
<td><strong>Relative Humidity</strong></td>
<td>5% to 95%</td>
<td>5% to 96%</td>
<td>5% to 95%</td>
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<tr>
<td><strong>Storage Temperature Range</strong></td>
<td>0°C to 55°C (32°F to 131°F)</td>
<td>0°C to 60°C (32°F to 140°F)</td>
<td>0°C to 45/55°C (32°F to 113/131°F)</td>
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<tr>
<td><strong>Maximum Outlets</strong></td>
<td>Basic BRMs: 42</td>
<td>Strip Metered: 42</td>
<td>Max. 48</td>
</tr>
<tr>
<td><strong>Maximum Operating Temp. Range</strong></td>
<td>Max. 48</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overcurrent Protection</strong></td>
<td>Software Electronic Overcurrent Protection</td>
<td>100% Rated 20A Branch Overcurrent Protection - Hydraulic Magnetic Circuit Breakers</td>
<td>Hydraulic Magnetic Circuit Breakers</td>
</tr>
<tr>
<td><strong>Idle Power Consumption</strong></td>
<td>3 W – 22 W</td>
<td>3W - 5W</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>GU Units Width x Depth</strong></td>
<td>75 mm x 104 mm (2.95 in x 4.09 in)</td>
<td>40.7 in x 74 in (1035 mm / 1880 mm)</td>
<td>333 mm - 1833 mm (13 in - 72 in)</td>
</tr>
<tr>
<td><strong>GU units Length</strong></td>
<td>1035 mm / 1880 mm (40.7 in / 74 in)</td>
<td>995 mm / 1004 mm / 1737 mm (39 in / 39.5 in / 68.4 in)</td>
<td>1U: 482.6mm x 44mm x 250mm (18.9in x 1.7in x 9.84in)</td>
</tr>
<tr>
<td><strong>1U/2U Units</strong></td>
<td></td>
<td></td>
<td>2U: 482.6mm x 88mm x 250mm (18.9in x 3.46in x 9.84in)</td>
</tr>
<tr>
<td><strong>Width x Height x Depth</strong></td>
<td></td>
<td></td>
<td>1U: 1737 mm x 88mm x 250mm (68.4in x 3.46in x 9.84in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2U: 1737 mm x 88mm x 250mm (68.4in x 3.46in x 9.84in)</td>
</tr>
<tr>
<td><strong>Standard Warranty</strong></td>
<td>2 years; Extended Warranties Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Agency Approvals</strong></td>
<td>UL, CSA, CE, RoHS, REACH, FCC Class A, CB, WEEE, ISTA*</td>
<td>UL, CSA, CE, BG, CB, RoHS, REACH, WEEE</td>
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</table>

* Agency approvals vary by region, please check with your local sales representative for details.

<table>
<thead>
<tr>
<th><strong>Metering Levels</strong></th>
<th><strong>Parameters Measured</strong></th>
<th><strong>Metering Accuracy</strong></th>
<th><strong>Switching Capability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate, Branch, Phase, Outlet</td>
<td>Volts, Current, kW, KVA, kWh, Power Factor, Crest Factor, Frequency</td>
<td>+/-1%</td>
<td>On, Off, Recycle, Lock, Unlock, Outlet Grouping Capability</td>
</tr>
<tr>
<td><strong>Modularity</strong></td>
<td>Power Entry Module</td>
<td>Branch Receptacle Module</td>
<td>RPC2™ communications module</td>
</tr>
<tr>
<td><strong>Local Management</strong></td>
<td>Optional Local Display</td>
<td>Onboard Display, Optional Local Display</td>
<td></td>
</tr>
<tr>
<td><strong>Remote Management</strong></td>
<td>Onboard Web Interface; CLI; SNMP; SSH; Telnet</td>
<td>Integration with Avocent® ACS, Avocent Universal Management Gateway &amp; Avocent MergePoint™ Unity Integration with DSView®; Rack Power Manager, Nform™ and the Trellis™ platform</td>
<td></td>
</tr>
<tr>
<td><strong>SNMP version support</strong></td>
<td>v1, v2 and v3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Authentication</strong></td>
<td>Local</td>
<td>Remote: Active Directory, LDAP, TACACS, Radius, Kerberos</td>
<td></td>
</tr>
<tr>
<td><strong>Encryption</strong></td>
<td>MDS, AES, DES</td>
<td></td>
<td></td>
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