AC Power
For *Business-Critical Continuity™*

Emerson Network Power Rack PDU Solutions

Rack Power Distribution For Critical IT Equipment

EMERSON™
Network Power

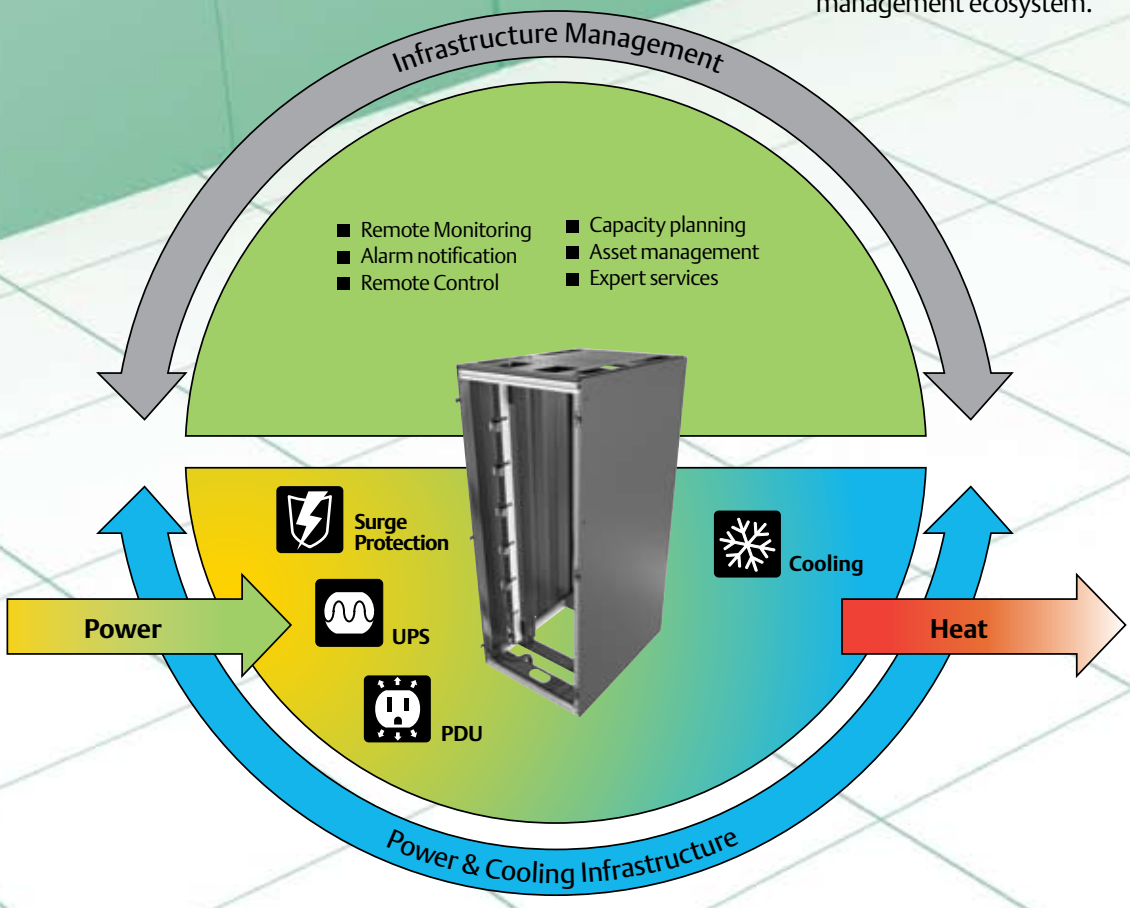
Enhanced Performance And Management Of Dynamic IT Spaces

IT space is a dynamic environment.

Today's successful businesses depend on adaptable technologies to help them respond quickly to market demands. Your data center must be built on a support infrastructure designed to match the power and cooling needs of rapidly changing IT initiatives such as virtualization and consolidation. Each IT change, move or addition will affect the entire support infrastructure—you need products and support that ensure your IT systems will operate reliably in these environments.

Emerson Network Power's portfolio of products from brands such as Liebert, Knurr, Alber, Aperture, and ASCO provide innovative, flexible solutions that ensure reliability and efficiency. With the help of monitoring and management tools from Emerson Network Power, the result is an infrastructure that will enable you to proactively manage your critical IT spaces.

The Rack PDU family of products is the connectivity point of IT systems into your power and cooling infrastructure and the critical interface to an efficient and effective infrastructure management ecosystem.



Emerson Network Power Rack PDU Family: Distribution Solutions From Basic To Adaptive

Liebert MPX— Adaptive Rack PDU

Delivers breakthrough, configurable/modular power and management technology. Its ability to increase availability and provide comprehensive control and metering capabilities are examples of pure innovation.

Liebert MPX is the perfect choice for a dynamic data center which frequently adds and moves equipment, and for any data center deploying or planning to deploy virtualization.

Liebert MPH— Managed Rack PDU

Offers several levels of metering in addition to control capabilities of connected equipment—a perfect solution for growing operations.

Knurr DI-STRIP— Basic Rack PDUs

For data centers with basic distribution needs, Emerson Network Power manufactures Basic Rack PDUs that deliver simple and expandable distribution in a robust package.

Infrastructure Management: The Key to Productive Operations

Improve the performance and management of your IT infrastructure with Liebert monitoring and control systems.

Liebert MPX and Liebert MPH include the following capabilities:

- Web-based monitoring
- Liebert Nform IT based centralized monitoring
- Liebert SiteScan centralized monitoring
- User located local display with the ability to view up to four PDU's
- Liebert SN rack sensors

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

Confidently take on the uncertain future of connected power requirements with Liebert MPX, the most responsive and adaptive rack PDU available. With Liebert MPX adaptive technology, you can economically increase availability of critical systems by leveraging hot-swappable modular power and managing power all the way to the receptacle level.

Liebert MPX Benefits:

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

Reconfigurable Power Capacity & Distribution

Liebert MPX 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.

The adaptive Liebert MPX offers a variety of user specified modules, including the MPX BRM (Branch Receptacle Module).

Designed for Critical Environments

- **Industry leading 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

Fits Needs Now And Later

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

Perfect For Blade Servers And Changing Environments

Data centers are moving to high density blade servers to utilize more processing power in less rack space, simplify cabling and reduced power consumption. Liebert MPX allows the data center to respond quickly to change, making it the right choice to manage the infrastructure.

Liebert MPX

Scalable Design Allows Onsite Configuration To Fit immediate IT Equipment Needs.

The Liebert MPX Adaptive Rack PDU features essential characteristics to support fast-paced, growing data centers.

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

Input Power

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

Status Display (RPC-BDM) is easily moved to the most convenient spot for the individual rack—even outside the rack. This tethered display may be located for user convenience.

INPUT POWER
- Reconfigurable—20 to 60 amp (NA); 16 to 63 amp (EU); single and three phase

OUTPUT DISTRIBUTION
- Scalable, mix compatible & hot-swappable
- Single phase NEMA 5-20R, IEC-C13, IEC-C19, Schuko
- Load balanced selection

MODULARITY
- Input power, output distribution, communications, and display
- Add connectivity with basic rack PDU expansion unit

METERING
- (1) Receptacle + Branch Receptacle Module + Aggregate Rack PDU
- (2) Branch Receptacle Module + Aggregate Rack PDU
- Mix compatible levels (1) & (2)
- Environmental sensors – Temperature & humidity

REMOTE RECEPTACLE CONTROL
- Receptacle level

LOCAL MONITORING
- User located display

REMOTE MONITORING
- Secure Web/SNMP Interfaces
- Liebert Nform
- Liebert SiteScan Web

OVERLOAD PROTECTION
- Physically and electrically isolated breaker per receptacle module
- Hydraulic-Magnetic breaker

RACK PDU ARRAY™
- Single IP for up to 4 Rack PDU's
- Liebert MPX and Liebert MPH on same private network

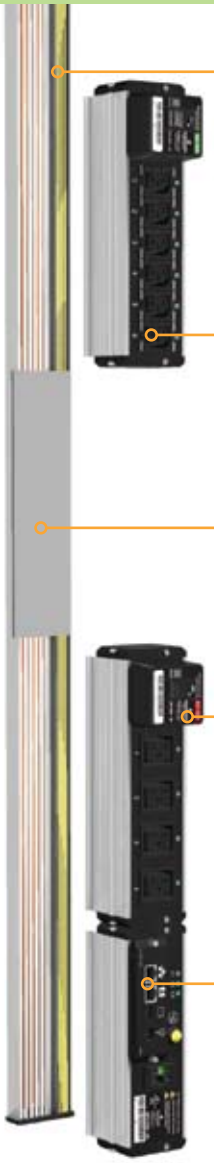
FORM FACTOR
- Vertical mount (Zero U)
- Fits in typical deep 23/42U racks and/or 800mm width racks

Liebert MPX: Hot-Swappable Power Output & Reconfigurable Power Input

Liebert MPX allows you to add or change distributed power without powering down. The hot-swappable receptacle modules allow for easy upgrading, and get IT equipment online quickly. Change input power configuration to support dynamic environments while maintaining distribution and communications infrastructure.

Adaptive Rack PDU

Liebert MPX is an adaptive Rack PDU system that provides AC input power, output distribution, and critical IT-quality performance via its scalable, modular architecture.



Power Rail Chassis (MPX PRC) distributes power and communications to all of the support modules

Branch Receptacle Modules (MPX BRM) provide output power connectivity and communications management

Power Rail Spacer covers the unused space until an MPX module is needed

Branch Receptacle Modules (MPX BRM)

Power Entry Module (MPX PEM) connects input power to power rail chassis

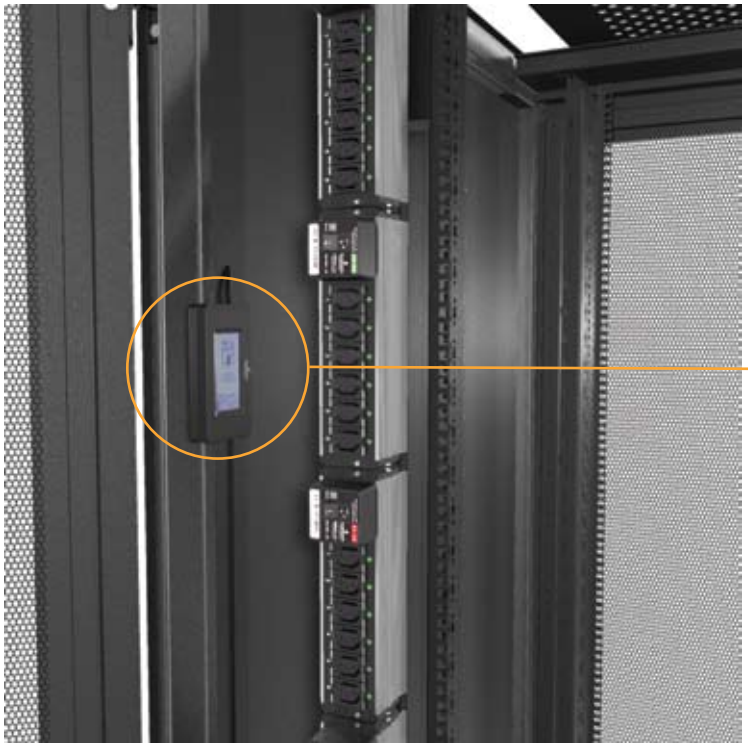
MPX PEM fixed capacity module for 40-63A 3-phase applications.

MPX PEM variable capacity module, 30A (NA)/32A (EU) and below 1 or 3 phase applications. Detachable power cord supports changing input power requirements.

Rack PDU Card (Liebert RPC) mounts in the Power Entry Module and provides upgradable network communications, sensor and local display interface.

MPX IPC (Input Power Cord) allows easy power reconfiguration to change input power to meet changing requirements. For MPX PEM variable capacity modules.

Liebert MPX may be remotely monitored and controlled via secure web/SNMP interfaces or Liebert Nform or Liebert SiteScan Web.



Monitoring Anywhere You Need It

From the individual receptacle of each discrete device to the complete rack PDU, monitoring is available to meet user needs. Displays are designed for easy user location to fit changing site needs.

Display and sensors are designed for easy mounting on the rack. A single display can manage up to four Liebert MPX or Liebert MPH systems and associated monitoring accessories.

RPC-BDM
displays power parameters and alarms for up to four Liebert MPX or Liebert MPH systems.

Display orients for horizontal or vertical installation and reading.

Liebert SN Family of Rack Sensors

Liebert MPX Benefits:

Flexibility

- Allows user to add individual hot-swappable modules for capacity as demand grows
- Offers the ability to change input capacity or configuration while maintaining Rack PDU infrastructure
- Provides for user located local and remote monitoring and management of connected loads
- Change monitoring and control functionality or mix on a single MPX to suit requirements.
- Position input power module for top or bottom rack entrance.

Higher Availability

- Controls and manages individual receptacles and or groups of loads and devices
- Predicts overcurrent conditions before they become critical
- Shuts down non-essential equipment during power outages to maximize availability and back-up power
- Expanded branch overload protection minimizes threat of cascading PDU overload
- Reliably delivers connected UPS power to the protected equipment

Lowest Total Cost Of Ownership

- Provides the most cost-effective design available—build, add on, or modify the platform design
- Allows redeployment of modules to suit changing needs
- Energy metering provides users the information to maximize the data center power and cooling infrastructure
- Liebert MPX modularity and flexibility extends the useful life of the infrastructure investment
- Employs energy efficient receptacle control technology

Liebert MPH—Managed Rack PDU: Advanced Monitoring And Control Support

Liebert MPH is a flexible Rack PDU solution with remote monitoring and control capabilities as well as environmental input options. It offers multiple power input selections and output configurations in both vertical zero-U and rackmount form factors. Up to four Liebert MPH PDUs may be interconnected as a Rack PDU Array™, consolidating user IP connections and device monitoring.

Liebert MPH Monitoring And Control Support

Monitored electrical parameters include: voltage, current, real and apparent power, power factor, and accumulated energy or consumption. Capacity based current thresholds provide comprehensive alarm notifications from the Rack PDU and branch.

Liebert MPH Can Benefit Your Data Center

- **Monitors electrical and environmental parameters** with set threshold and alarm tools
- **Controls access** of receptacle power
- **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

Liebert MPH Benefits:

Flexibility

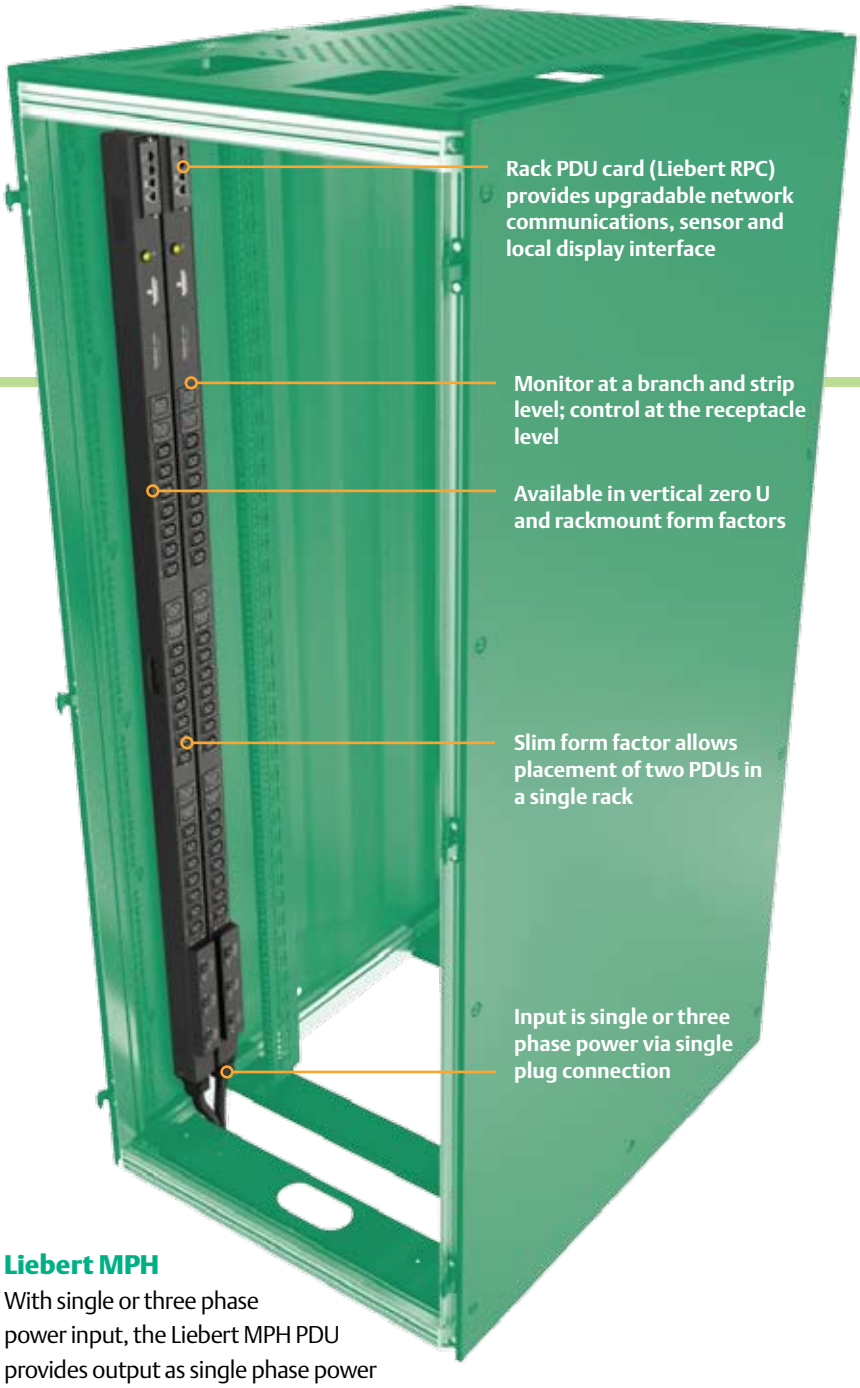
- Local displays are easily located to suit a crowded and changing rack environment
- Supports mounting in 19" EIA, 42U rack environments—Offered in vertical, zero U and rackmount form factors
- Provides a compatible monitoring platform for Liebert MPH and Liebert MPX, offering seamless common operation if deployed together
- User positioned input power cord interface

Higher Availability

- Controls and manages individual receptacles
- Predicts overcurrent conditions before they become critical
- Shuts down non-essential equipment during power outages to maximize availability and back-up power
- Expanded branch overload protection minimizes threat of cascading PDU overload
- Industry leading operating temperature—up to 55˚C / 131˚F to support hot Internal rack environments

Lowest Total Cost Of Ownership

- Provides full featured monitoring and control in a cost effective package
- A Rack PDU Array shares a single IP address for up to four Rack PDUs, making deployment faster and easier
- Energy and power metering provides users the information to maximize the data center power and cooling infrastructure
- Employs energy efficient receptacle control technology



Liebert MPH

With single or three phase power input, the Liebert MPH PDU provides output as single phase power and is offered in vertical, Zero U and rack mount form factors to support mounting in 19" EIA 42U rack environments.

Status Display (RPC-BDM) provides users optimal local display positioning by allowing mounting on rack doors or wherever best suited for a changing rack environment.

Liebert MPH

INPUT POWER
- 20 to 30 amp (NA); 16 to 32 amp (EU); single and three phase

OUTPUT DISTRIBUTION
- Single phase NEMA 5-20R, IEC-C13 & IEC-C19 ; Combination systems

MODULARITY
- Modular card-based communications and display
- Add connectivity with basic rack PDU expansion unit

METERING
- Branch and aggregate Rack PDU
- Environmental sensors – Temperature & humidity

REMOTE RECEPTACLE CONTROL
- Receptacle level

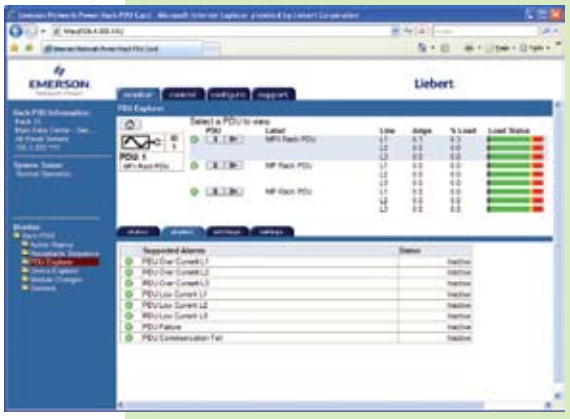
LOCAL MONITORING
- User located display

REMOTE MONITORING
- Secure Web/SNMP Interfaces
- Liebert Nform
- Liebert SiteScan Web

OVERLOAD PROTECTION
- Breaker per branch as required
- Hydraulic-Magnetic breaker

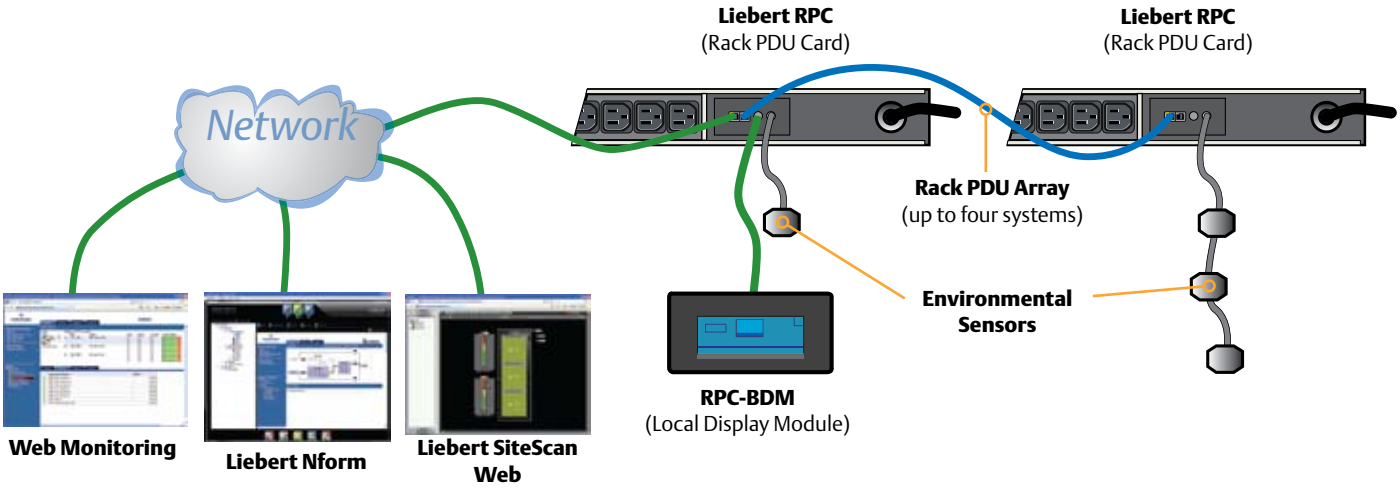
RACK PDU ARRAY
- Single IP for up to 4 Rack PDU's
- Liebert MPX and Liebert MPH on same private network

FORM FACTOR
- Vertical mount (Zero U)
- Rackmount



Liebert MPH may be remotely monitored through a variety of convenient interfaces.

Rack PDU Power Management And Monitoring Interfaces



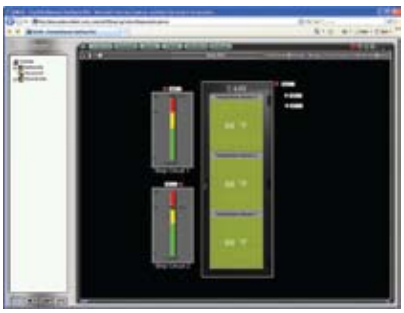
Infrastructure Management

Secure Web/SNMP Interfaces

- User configured alarm thresholds
- High alarm and warning; low alarm
- Receptacle state and sequencing configuration
- Electirical metering, volts, amps, kW & kW/hr
- Rack PDU Array—Device consolidation
- PDU Explorer—Intuitive hierarchical interface
- View PDU status by strip or receptacle
- Device Explorer—Browsing by user defined device name

Liebert Nform IT Based Centralized Monitoring Software

- Trending of power data
- Receptacle group control



Liebert SiteScan Web

- Centralized monitoring software
- Provides real-time monitoring and control

Optional Hardware

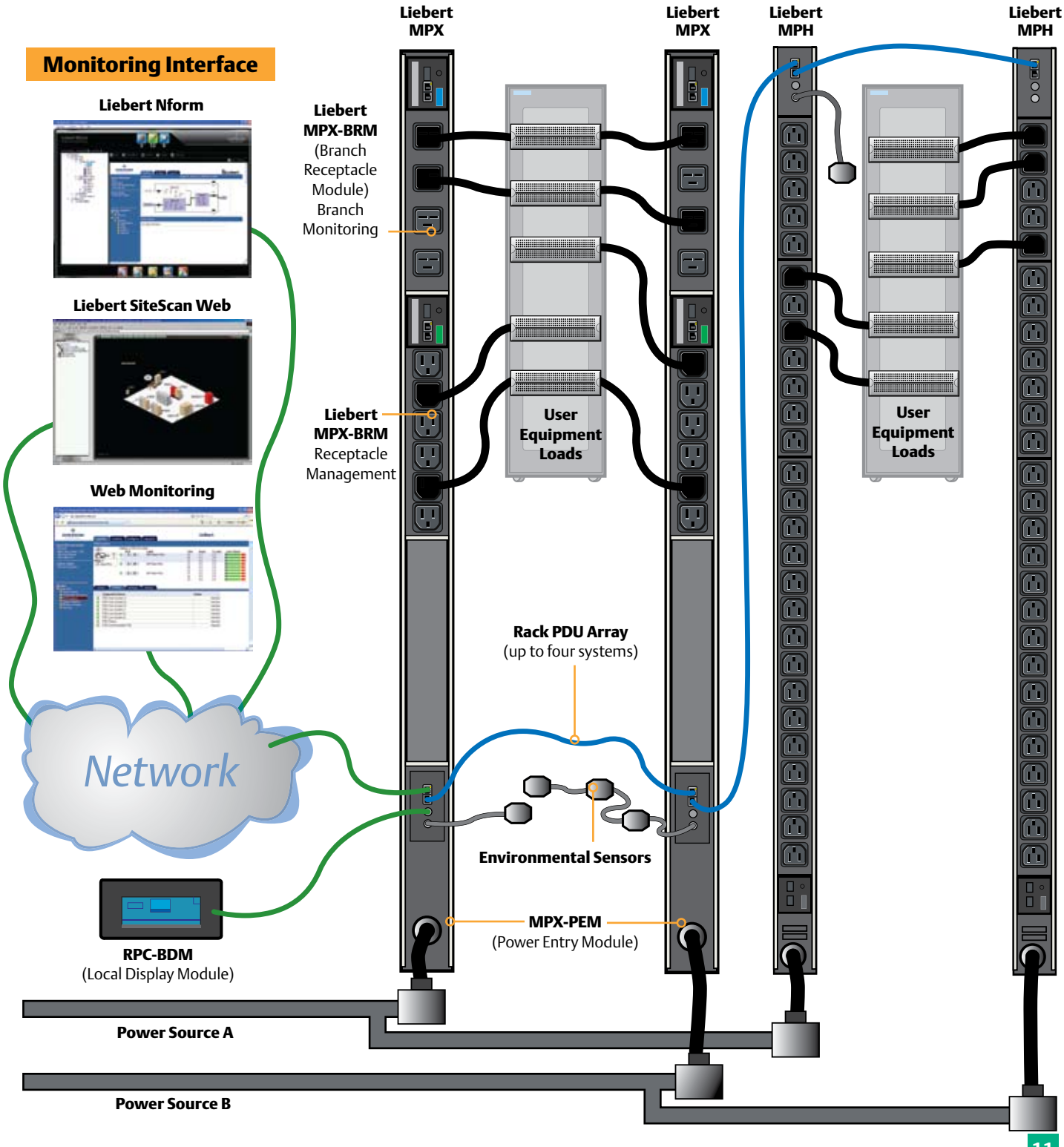
RPC-BDM Local Display Module

- Electrical and environmental parameters
- One RPC-BDM supports up to 4 PDUs on array
- PDU explorer
- Device Explorer

Liebert SN Family Of Rack Sensors

- Single or multi-probe temperature
- Multi-probe temperature and humidity
- Auto-config – no set-up required

Rack PDU Connectivity And Rack PDU Arrays



Knurr DI-STRIP: Basic Rack PDUs, Standard And HighPower Systems

Knurr Basic Rack PDUs are the right answer for data center users selecting robust, economical and flexible rack power solutions.

Knurr DI-STRIP® Power Strips 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 with a range of accessories including circuit breakers, overvoltage protection and more.

Flexibility to meet a broad range of requirements

Knurr DI-Strips Benefits:

Flexibility

- Multiple configurations and input power options available including international compatibility
- The addition of the Basic Rack PDU Expansion Unit allows for growth
- 10ft. (3m) power supply cable offers room for movement

Higher Availability

- Reliable and robust solution
- Worldwide approvals and certification
- Full-length brass busbar on Standard models enhances operational reliability
- Standard system extruded casing, and HighPower system heavy duty casing provide durability
- Industry leading operating temperature—up to 55˚C / 131˚F to support hot Internal rack environments

Lowest Total Cost of Ownership

- Simple and quick installation on the rack's extrusion requires minimal space and reduces installation time

The Basic Rack PDU Expansion Unit allows for system growth of any Rack PDU system -- Liebert MPX, Liebert MPH, or Knurr DI-STRIP.

Construction

Extruded casing and full length brass busbar enhance the durability and reliability of the Standard systems.

Heavy duty casing and reduced wiring contact points are quality features of the HighPower systems.

Models And Configurations

Available in a wide variety of models and power configurations to meet most site needs.

Quick Guide

Knurr DI-STRIP

INPUT POWER
- 15 to 60 Amp (NA); 16 to 32 Amp (EU); Single and three phase
- Single or dual input feed

OUTPUT DISTRIBUTION
- Single phase, NEMA 5-20R, IEC-C13 & C19, Combination systems

MODULARITY
- Add connectivity with basic rack PDU expansion unit

METERING
- Panel level via Liebert LDM monitoring

OVERLOAD PROTECTION
- Breaker per branch as required
- Hydraulic-Magnetic breaker

FORM FACTOR
- Vertical (Zero U) mount
- Rackmount

Power Distribution And Racks To Build A Reliable, Adaptive IT Environment

Liebert And Knurr Rack Based Support Solutions

Liebert delivers rack systems, and a full line of enclosures for your data center in addition to our managed power products. (North American applications)

Knurr Racks

Knurr racks provide the convenience of robust 19" racks with high end features and standardized options to provide fast customization for individual site needs. The racks are designed for optimized air flow and maximized useful mounting space.

- Fully assembled racks
- Side panels
- Improved airflow with 83% open area on perforated doors –the industry's highest
- Enclosure height of 42U
- Widths of 600mm, 700mm or 800mm
- Depth of 900mm, 1000mm, 1200mm
- Mounting and cable management options, including tool-less options
- Low profile casters

Knurr Rack

Lightweight design
extruded aluminum framing superior in strength but 50 pounds lighter than standard steel-frame racks.

Unsurpassed airflow
83% perforated doors improve heat reduction

Tool-less accessories
simple installation with a twist of the wrist.

Liebert FDC—Rack-Size Power Distribution Solutions For Growing IT Operations

Integrate power distribution into the rack environment with the rack-sized Liebert FDC power distribution cabinet. The stand-alone cabinet blends physically and cosmetically with rack equipment, while offering the distribution capabilities of a much larger unit. (North American applications)

Liebert FPC—Power Conditioning And Distribution Cabinet For High Density Data Centers

The rack-size Liebert FPC power conditioning and distribution cabinet provides higher quality, more flexible power distribution for high-density data centers. It is engineered to combine the convenience and cost savings of a pre-packaged, factory-tested unit with the flexibility of a custom-tailored power system. This self-contained system provides power isolation, power distribution, computer-grade grounding and power monitoring. (North American applications)

Rack PDU - OVERVIEW

Applications - Systems: NA = North American; EU = European

Product	Base Support / Selection Criteria	Capacity Range (kW)	Power Monitoring	Key Monitoring Values/ Accuracy	Receptacle Control	Form Factor	Max Operating Temperature
Liebert MPX	- Changing Infrastructure - Input/output power & Monitoring - Metering - Aggregate, Branch & Receptacles; Environmental - Critical Data Center Environments	NA: 2.8 - 17.2 EU: 4.0 - 28.0	Aggregate, Branch, &/or Receptacle	+/-1%: Amps, Volts +/-2%:kW, kW-h, kVA, Temp.& Hum. (opt.)	Optional	Vertical	55C / 131F
Liebert MPH	- Fixed Infrastructure - Input/output power - Metering - Aggregate & Branch; Environmental - Critical Data Center Environments	NA: 1.9 - 8.6 EU: 4.0 - 22.0	Aggregate, Branch	+/-1%: Amps, Volts +/-2%:kW, kW-h, kVA, Temp.& Hum. (opt.)	Optional	Vertical, Rackmount	55C / 131F
Knurr DI Strips	- Fixed infrastructure - Input/output power - External Metering - Separate panel level monitoring - Critical & Non-Critical Data Center Environments	NA: 1.4 - 24.0 EU: 4.0 - 25.0	Optional Panel Level - Liebert LDM	-------	-------	Vertical, Rackmount	55C/131F

* All Systems - Agency & Approvals: Global approvals and compliance

Liebert MPX - Adaptive Rack PDU's SUMMARY

Power & Comms Backplane - MPX PRC (Power Rail Chassis) *One Per Liebert MPX System*

Typical 42/47U Racks	MPX PRC1880 - 1880mm/74" - Supports up to 60/63 Amp input and up to 6x MPX BRM's (Branch Receptacle Modules)
Typical 23U Racks:	MPX PRC1035 - 1035mm/41" - Supports up to 30/32 Amp input and up to 3x MPX BRM's (Branch Receptacle Modules)

Input Power - MPX PEM (Power Entry Module)

One Per Liebert MPX System

Available Voltage	NA: 120 & 208VAC / 1-Phase; 208-240VAC / 3-Phase
	EU: 230 / 1-Phase, 400VAC / 3-Phase
MPX PEM-Variable Capacity	NA: 20Amp / 1-Phase to 30Amp / 3-Phase
	EU: 32Amp / 1-Phase to 32Amp / 3-Phase
	Input power selected with MPX-IPC (Input Power Cord)
MPX PEM-Fixed Capacity	NA: 3-Phase; 50Amp 4-wire or 60Amp 5-wire
	EU: All 3-Phase; 63Amp 5-wire

Output Distribution - MPX BRM (Branch Receptacle Module)

One to Six Per Liebert MPX System - Quantity Per MPX PRC Length

Types – can be mixed on a single MPX system	Branch Monitoring - Monitor Module and Aggreate MPX
	Receptacle Management - Control & monitor to individual receptacles
Receptacles per BRM	NA: 6x NEMA 5-20R; 6x IEC-C13; 4x IEC-C19
	EU: 6x IEC-C13; 4x IEC-C20; 3x Schuko
Protection	Branch rated circuit breaker - 20Amps / Full rating
Application / Install	Hot-swappable

Liebert MPH - Managed Rack PDU's SUMMARY (North American Systems)

120VAC-Single Phase Input / Output	
Rackmount Form Factor	20 or 30 Amp NEMA input; 9x 5-20R receptacles
Vertical Form Factor	20 or 30 Amp NEMA input; 27x 5-20R receptacles
208-240VAC-Single Phase Input / Output	
Rackmount Form Factor	20 or 30 Amp NEMA input; 9x IEC-C13 receptacles
Vertical Form Factor	20 or 30 Amp NEMA input; 27x IEC-C13 receptacles or 21x IEC-C13 plus 6x IECC19 receptacles
120/208VAC-Three Phase Input / 208 & 120VAC Output	
Vertical Form Factor	30 Amp NEMA input; 27x IEC-C13 or 5-20R; 21x IEC-C13 plus 6x IEC-C19 receptacles; or IEC-NEMA combinations

Liebert MPH - Managed Rack PDU's SUMMARY (European Systems)

230VAC-Single Phase Input / Output	
Rackmount Form Factor	16 or 32 Amp IEC input; 9x IEC-C13 receptacles
230VAC-Single Phase Input / Output	
Vertical Form Factor	16 or 32 Amp IEC input; 27X IEC-C13 or 21x IEC-C13 plus 6x IEC-C19 receptacles
400VAC-3Phase Input / 200VAC Outputt	
Vertical Form Factor	16 or 32 Amp IEC input; 27x IEC-C13 or 21x IEC-C13 plus 6x IEC-C19 receptacles

Knurr DI Strips - Basic Rack PDU's SUMMARY (North American Systems)

120VAC-Single Phase Input / Output	
Rackmount Form Factor	15 or 20 Amp NEMA input; 9x 5-20R receptacles
Vertical Form Factor	15, 20 & 30 Amp NEMA & "Expansion" input; 12-24x 5-20R receptacles
208-240VAC-Single Phase Input / Output	
Rackmount Form Factor	20 or 30 Amp NEMA & "Expansion" input; 4x IEC-C20 or 9x IEC-C13 receptacles
Vertical Form Factor	20 or 30 Amp NEMA & "Expansion" input; 12-24x IEC-C13 & C19 receptacles
120/208VAC-Three Phase Input / 208 & 120VAC Output	
Vertical Form Factor	20 to 52 Amp NEMA & IEC input; 6x to 48X 5-20R, IEC-C13, C19 & combinations

Knurr DI Strips - Basic Rack PDU's SUMMARY (European Systems)

230VAC-Single Phase Input / Output	
Rackmount Form Factor	16 or 32 Amp IEC input; multiple receptacles
230VAC-Single Phase Input / Output	
Vertical Form Factor	16 or 32 Amp IEC & "Expansion" input; multiple receptacles
400VAC-3Phase Input / 200VAC Outputt	
Vertical Form Factor	16 & 32 Amp IEC input; multiple receptacles

All systems are RoHS compliant. RoHS 2002/95/EC

Ensuring The High Availability Of Mission-Critical Data And Applications.

Emerson Network Power, the global leader in enabling business-critical continuity, ensures network resiliency and adaptability through a family of technologies — including Liebert power and cooling technologies — that protect and support business-critical systems. Liebert solutions employ an adaptive architecture that responds to changes in criticality, density and capacity. Enterprises benefit from greater IT system availability, operational flexibility, and reduced capital equipment and operating costs.

Emerson Network Power
Liebert Corporation

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Emerson Network Power.
The global leader in enabling *Business-Critical Continuity*™.

- **AC Power**
- Connectivity
- DC Power
- Embedded Computing
- Embedded Power
- Monitoring
- Outside Plant
- Power Switching & Controls
- Precision Cooling
- Racks & Integrated Cabinets
- Services
- Surge Protection