Emerson Network Power Rack PDU Solutions

Rack Power Distribution For Critical IT Equipment









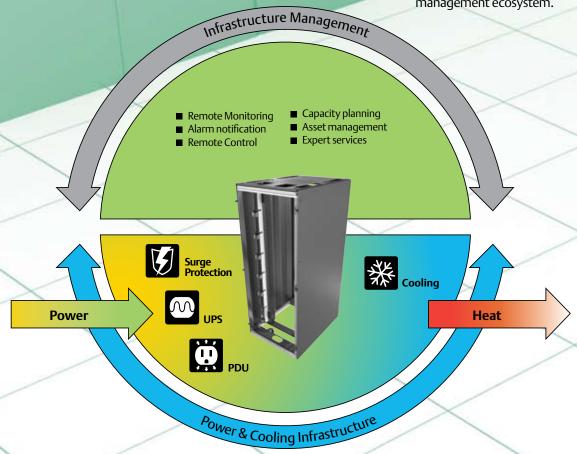
Enhanced Performance And Management Of Dynamic IT Spaces

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.



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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.

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.



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





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.

Quick Guide

Liebert MPX

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.

MPX PEM variable capacity module, 30A (NA)/32A (EU) and below 1 or 3 phase applications.

Detachable power cord

supports changing input

power requirements.

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



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







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

Rack PDU Card (Liebert RPC)

Provides upgradable network communications, sensor and local display interface

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

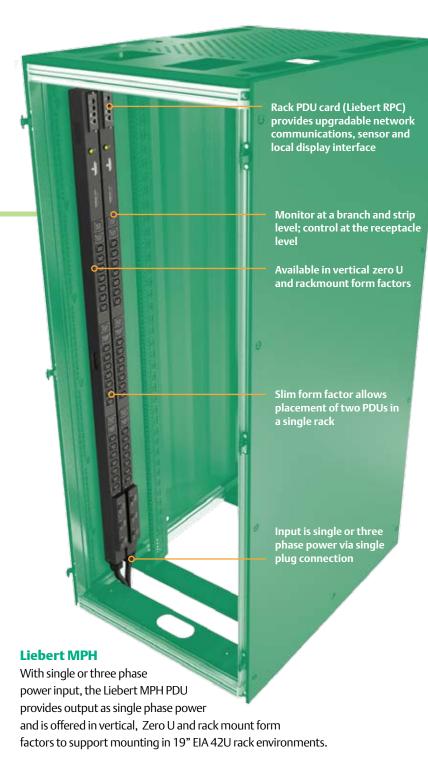
- Provides full featured monitoring and control in a cost effective package
- A Rack PDU Array shares a single IP address for up to four Rack PDUs, making deployment faster and easier
- Energy and power metering provides users the information to maximize the data center power and cooling infrastructure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



Branch Overload Protection

Flexible Power Cord Mount

User adjustable for horizontal or vertical orientations





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.

Quick Guide

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

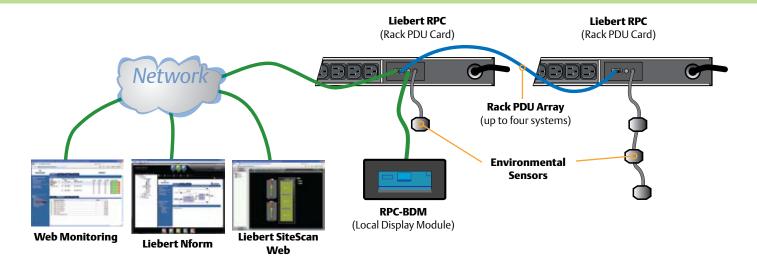
FORM FACTOR

- 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



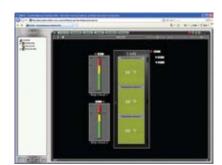
Secure Web/SNMP Interfaces

- 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

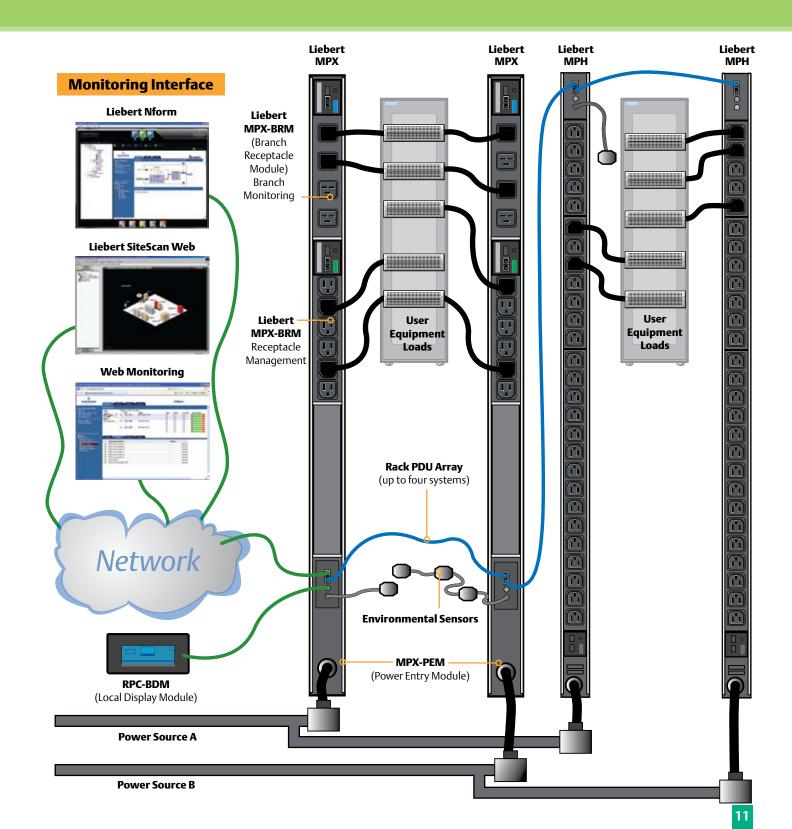
- Electrical and environmental parameters
- One RPC-BDM supports up to 4 PDUs on array
- PDU explorer
- Device Explorer



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.



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





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

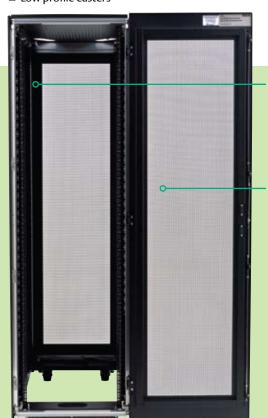
Liebert And Knurr Rack Based Support Solutions

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

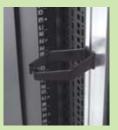
extruded aluminum framing superior in strength but 50 pounds lighter than standard steel-frame racks.

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

 $^{^{\}ast}$ 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	Branch Monitoring - Monitor Module and Aggreate MPX			
on a single MPX system	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			
	·			

	receptacies; or iec-inemia combinations			
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			



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

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