### Emerson Network Power Rack PDU Solutions

Rack Power Distribution For Critical IT Equipment









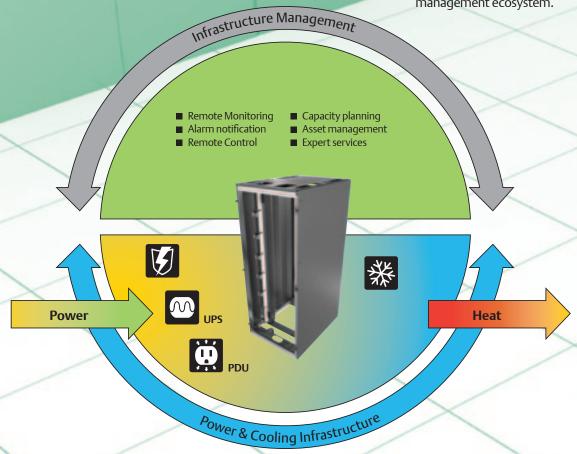
### Enhanced Performance And Management Of Dynamic IT Spaces

#### 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.





### 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 & hotswappable
- 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 fixed capacity module for 208V 40-60A, 415V 30A (NA) and 400V 63A (EU) 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.



### **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)

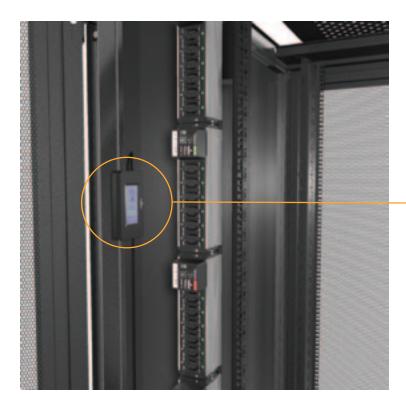
connects input power to power rail chassis



capacity modules.

iebert MPX
nay be remotely
nonitored and
controlled via
ecure web/SNMP
nterfaces or Liebert
liform or Liebert





#### **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 60A 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**

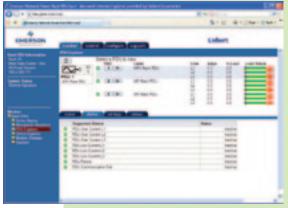
- Breaker per branch as required
- Hydraulic-Magnetic breaker

#### **Rack PDU Array**

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

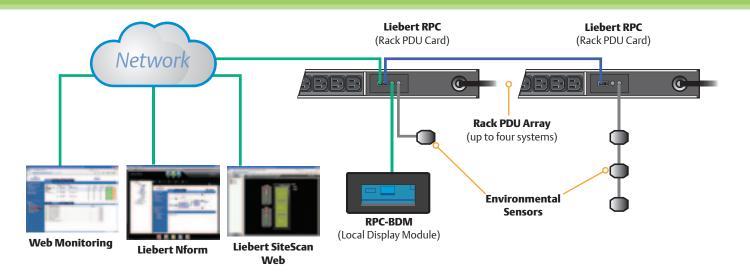
#### **FORM FACTOR**

- Vertical mount (Zero U)
- Rackmount



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

### Rack PDU Power Management And Monitoring Interfaces



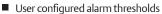
#### **Infrastructure Management**



#### **Avocent Rack Power Manager software**

- Centralized configuration, event logging and management of all Rack PDU's
- Centralized permissioning and remote authentication leveraging Active Directory, LDAP, Radius, Kerberos etc.
- Grouping capabilities for power control or for power consumption reports
- Canned and custom power consumption reports with scheduling option

#### **Secure Web/SNMP Interfaces**



- 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

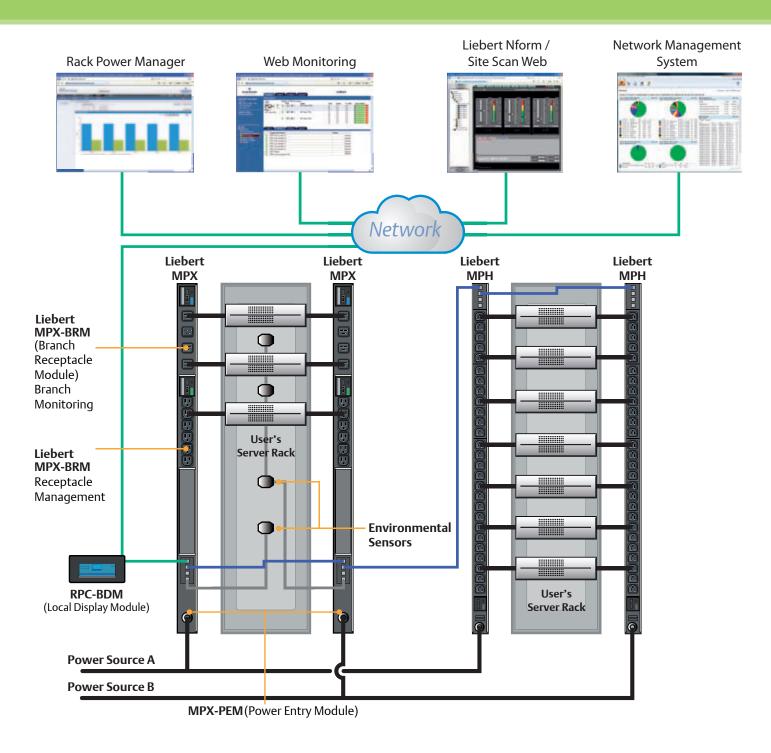


#### **Liebert SN Family Of Rack Sensors**

- Modular and integrated systems
- Temperature, humidity and contact probes
- 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

### Flexible Data Center Equipment Rack Systems

Emerson Network Power delivers rack systems compatible with our rack PDUs, which also provide a matching line-up when deployed with Liebert row-based power and cooling products.

#### **Optimized and Modular Rack Systems**

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

- Fully assembled racks
- Side panels
- Improved airflow with up to 83% open area on perforated doors –the industry's highest
- Enclosure height of 42U or 48U
- Widths of 600mm or 800mm
- Depth of 1100mm or 1200mm
- Mounting and cable management options, including tool-less options
- Low profile casters

#### **DCF Optimized Rack**

- Welded steel construction
- 75% perforation on doors
- Split, locking side panels
- 42U cabinet fits through standard doorways
- Tool-less cable . management







## 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)



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, computergrade grounding and power monitoring. (North American applications)



Rack PDU -	OVERVIE	N								
Applications - S	ystems: NA = N	North American; EU = European		r		T				
Product Base Suppor		t / 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		NA: 2.8 - 17.2	Aggregate, Branch	, +/-1%: Amps, Volts	Optional	Vertical	55C / 131F		
		Aggregate, Branch & Receptacles; Environmental	EU: 4.0 - 28.0	&/or Receptacle	+/-2%:kW, kW-h, kVA,					
	- Critical Data Center Environments		NA: 1.9 - 17.2 Aggre		Temp.& Hum. (opt.)					
Liebert MPH		- Fixed Infrastructure - Input/output power - Metering - Aggregate & Branch; Environmental		Aggregate, Branch	1 ' '	Optional	Vertical,	55C / 131F		
	1	Aggregate & Branch; Environmental a Center Environments	EU: 4.0 - 22.0		+/-2%:kW, kW-h, kVA, Temp.& Hum. (opt.)		Rackmount			
Knurr DI Strips		ed infrastructure - Input/output power		Optional Panel			Vertical,	55C/131F		
Midil Di Strips		etering - Separate panel level monitoring	NA: 1.4 - 24.0 EU: 4.0 - 25.0	Level - Liebert LDN	1		Rackmount	336/1311		
		on-Critical Data Center Environments								
		vals: Global approvals and compliance								
		ive Rack PDU's SUMMARY								
Power & Co	omms Bacl	kplane - MPX PRC (Power Rail Chassis								
Typical 42/47U	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 Rac	cks:	MPX PRC1035 - 1035mm/41" - Supports up to 30	)/32 Amp input a	nd up to 3x MPX BRM	l's (Branch Receptacle Modu	ıles)				
Input Powe	er - MPX PE	M (Power Entry Module)			Output Distribution	on - MPX BR	RM (Branch Re	ceptacle Module)		
One Per Liebert MPX System					One to Six Per Liebert MPX System - Quantity Per MPX PRC Length					
Available Voltage		NA: 120 & 208VAC / 1-Phase; 208-240VAC / 3-Phase			Types – can be mixed on a single MPX system	Branch Monitoring - Monitor Module and Aggreate MPX				
		NA: 415VAC/3-Phase				Receptacle Management - Control & monitor to individual				
		EU: 230 / 1-Phase, 400VAC / 3-Phase				receptacles				
MPX PEM-Variable Capacity		NA: 20Amp / 1-Phase to 30Amp / 3-Phase			Receptacles per BRM	NA: 6x NEMA 5-20R; 6x IEC-C13; 4x IEC-C19				
		EU: 32Amp / 1-Phase to 32Amp / 3-Phase	32Amp / 3-Phase			EU: 6x IEC-C13; 4x IEC-C20; 3x Schuko				
		nput power selected with MPX-IPC (Input Power Cord)			Protection	Branch rated circuit breaker - 20Amps / Full rating				
MPX PEM-Fixed Capacity		NA:3-phase 208V 50Amp 4-wire or 60Amp 4 or 5 wire, 3-phase 415V 30A 5-wire			Application / Install	Hot-swappab	le			
		EU: All 3-Phase; 63Amp 5-wire								
Liebert MPH - Managed Rack PDU's SUMMARY (North American Systems)					Liebert MPH - Managed Rack PDU's SUMMARY (European Systems)					
120VAC-Single Phase Input / Output										
Rackmount For	m Factor	20 or 30 Amp NEMA input; 9x 5-20R receptacles			230VAC-Single Phase Input / Output					
Vertical Form Fa	Vertical Form Factor 20 or 30 Amp NEMA input; 27x 5-20R receptacles		5			r 16 or 32 Amp IEC input; 9x IEC-C13 receptacles				
208-240VAC-Single Phase Input / Output					230VAC-Single Phase Input / Output					
Rackmount For	Rackmount Form Factor 20 or 30 Amp NEMA input; 9x IEC-C13 recepta		25		Vertical Form Factor	16 or 32 Amp IEC input; 27X IEC-C13 or 21x IEC-C13 plus				
Vertical Form Fa	actor	20 or 30 Amp NEMA input; 27x IEC-C13 receptacles			6x IEC-C19 receptacles					
		or 21x IEC-C13 plus 6x IECC19 receptacles			400VAC-3Phase Input / 200VAC Outputt			513 31 IFC 613 L		
120/208VAC-Three Phase Input / 208 & 120VAC Output							16 or 32 Amp IEC input; 27x IEC-C13 or 21x IEC-C13 plus 6x IEC-C19 receptacles			
Vertical Form F	orm Factor 30 Amp NEMA input; 27x IEC-C13 or 5-20R; 21x IEC-C13			-C19, or	ONICE C13 receptations					

Vertical Form Factor:	50A or 60A IEC input; 21x IEC-C13 plus 6x IEC-C19					
415VAC-Three Phase Input / 240VAC Output						
Vertical Form Factor:	30A NEMA Input; 21xIEC-C13 plus 6xIEC-C19					
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					

15xIEC-C13, 6xIEC-C19, plus 6x5-20R receptacles

208VAC-Three Phase Input / 208V Single Phase Output

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, a business of Emerson (NYSE:EMR), delivers software, hardware and services that maximize availability, capacity and efficiency for data centers, healthcare and industrial facilities. A trusted industry leader in smart infrastructure technologies, Emerson Network Power provides innovative data center infrastructure management solutions that bridge the gap between IT and facility management and deliver efficiency and uncompromised availability regardless of capacity demands. Our solutions are supported globally by local Emerson Network Power service technicians. Learn more about Emerson Network Power products and services at www.EmersonNetworkPower.com

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