

# *Adaptive power distribution in the data center*

*A step towards the future with Emerson Network Power*



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## Server rack power distribution



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## Emerson Network Power

*Business-Critical Continuity™- so your success continues!*

### Core competencies:

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

No company, no matter how big it is, can afford business-critical system failures.

Over the years we at Emerson Network Power have acquired unique know-how, and with our name we represent reliable rack systems, power supply, precision cooling, connectivity and integrated solutions. We can consequently ensure that you generate optimum benefits from your technology investments.

Thanks to Emerson Network Power's technology range and expansive competencies, the entire bandwidth of company-wide solutions is supported for today's critical business requirements.

Customers all over the world build on our support for future-proof investments, because they know that we offer globally specific innovations and optimized solutions from one single source – supported by reliable local service and support.

We can ensure the stable operation of your network infrastructure – regardless of whether voice, data or multimedia content are transmitted.

This is based on a proven, comprehensive portfolio of products, services and systems which supports a multitude of computing, telecommunications, health care and industrial applications. This creates a foundation of trust that is only possible with a partnership with Emerson Network Power.

Our assignment is to prepare you for the unknown and the unexpected. We show you the way against the background of dynamic changes in your business environment.

And we help you to master the requirements this entails and avail of the greatest possible benefits from your technology investments. This is what we mean by Business-Critical Continuity.



# Safe, efficient and economical: Rack PDUs from Emerson Network Power

Reliable power distribution in a server rack is extremely important! Emerson Network Power's "Power Distribution Units (PDU)" provide immense **security and availability** with a robust electro-mechanical setup.

The rack PDUs ensure a sound **economical benefit**. The Liebert MPX™'s modularity also enables requirements-oriented and constantly compatible expansion.

The rack PDUs provide the perfect economical solution for every specific requirement and exceptional efficiency with numerous technical features.



*Interacting with rack PDUs, rack monitoring systems and cooling systems, Liebert NFORM guarantees the monitoring and controlling of all relevant infrastructure parameters in server rooms and data centers, alarms as required, and even intercepts controlling to prevent damages.*

## PDU product series overview:

<b>BASIC</b>	<p><b>Features:</b></p> <ul style="list-style-type: none"> <li>■ High stability and torsional strength provided with closed sheet steel extrusions and perfected integration into Knürr rack systems.</li> <li>■ Best possible conductivity: continuous brass busbars with many models.</li> <li>■ Double spring contacts for shock hazard-proof and low contact resistance.</li> </ul>	
<b>MANAGED</b>	<p><b>Additional features:</b></p> <ul style="list-style-type: none"> <li>■ Highest possible security and availability with an operating temperature of max. 55°C.</li> <li>■ Extensive measurement functions (power, current, voltage and energy), with high measurement accuracy of up to ± 1%.</li> <li>■ Remote-switchable outputs with many models.</li> <li>■ Same communication cards as with Liebert MPX™ used, which means same software interface as with administration.</li> <li>■ Up to 4 Liebert MPX™/MPH™ can be controlled via one IP address.</li> <li>■ External sensors and a display can also be addressed.</li> </ul>	
<b>ADAPTIVE</b>	<p><b>Additional features:</b></p> <ul style="list-style-type: none"> <li>■ The Liebert MPX™ is a modular PDU; input modules and output modules can be flexibly equipped as required.</li> <li>■ Additional wiring between the modules is not required; a fixed databus is integrated on a continuous busbar.</li> <li>■ Highest power density up to max. 3 x 63 A per bar possible.</li> <li>■ Possible failures can be detected early on with additional monitoring (N-conductor, apparent power, crest factor and power factor).</li> <li>■ Depending on the output module measuring and remote switching is possible up to output level, which allows each server to be monitored individually.</li> <li>■ The output modules can be changed during running operation; there are no downtimes.</li> </ul>	

# Emerson Network Power Rack PDUs Europe – product series overview

	From page 22			From page 16		From page 8			
	Knürr DI-STRIP BASIC Rack PDU®			Liebert MPH™ MANAGED Rack PDU		Liebert MPX™ ADAPTIVE Rack PDU			
Features	Knürr DI-STRIP® Elementary	Knürr DI-STRIP M®	Knürr DI-STRIP RM®	Liebert MPH™ Branch Monitored	Liebert MPH™ controlled	Liebert MPX™ Elementary	Liebert MPX™ Elementary Phase monitored	Liebert MPX™ Branch monitored	Liebert MPX™ Receptacle managed
Power distribution	x	x	x	x	x	x	x	x	x
Modular						x	x	x	x
Display		Fixed	Fixed	Modular	Modular		Modular	Modular	Modular
Remote interface			x	x	x		x	x	x
Measuring at input level		x	x	x	x		x	x	x
Measuring per group				x	x			x	x
Measuring per output									x
Switching per output					x				x
Measurement parameters		A	A	A,V,W,KWh, Hz	A,V,W,KWh, Hz		A,V,W,KWh, Hz	A,V,W,KWh, VA, Hz, Power factor	A,V,W,KWh, VA, Hz, Power factor, crest factor
Input power	1ph + 3ph max 32A	1ph + 3ph max 32A	1ph + 3ph max 32A	1ph + 3ph max 32A	1ph + 3ph max 32A	1ph + 3ph max 63A	1ph + 3ph max 63A	1ph + 3ph max 63A	1ph + 3ph max 63A
Outputs	IECC13&C19 Schuko Switzerland France	IECC13&C19 Schuko Switzerland France	IECC13&C19 Schuko Switzerland France	IECC13&C19	IECC13&C19	IECC13&C19 Schuko	IECC13&C19 Schuko	IECC13&C19 Schuko	IECC13&C19 Schuko
Connection option for different sensors				x	x		x	x	x

The Liebert MPX™ and Liebert MPH™ accessories are largely identical, which simplifies administration!

INFO

You will find further details and order numbers in our product catalog:  
[www.emersonnetworkpower-emea.com](http://www.emersonnetworkpower-emea.com)



reddot design award  
winner 2011

# Liebert MPX™ Adaptive Rack PDU: Respond requirement-oriented to every change!

The Liebert MPX™ modular rack PDU system™ impressively scores points with maximum flexibility, highest possible availability and low operating costs. With Liebert MPX™ users can react quickly and specifically to new requirements for rack power supply and management.

Liebert MPX™ enables users to dimension their rack PDU system so that current requirements are met first. The system can be flexibly adjusted when requirements change later on. Liebert MPX™ builds on a design based on a power supply/communication bus and input/output modules.



**Status display (RPC-BDM)**  
Can be easily positioned at the optimum spot for the individual rack; also functions outside the rack. This connected display can be mounted just as the user wishes.

## Highest possible security and availability with:

- Redundant power supply for control electronics (with redundant tapping of different phases in the Power Entry Module).
- Fixed databus on the busbar (making cable breaks a thing of the past).
- Complete data tapping on the PEM (without additional external monitoring devices).
- Additional neutral conductor measurement.
- Crest factor measurement (network quality rating, which means network component failures can be identified early on).

## Maximum flexibility and scalability with:

- Configuration of all modules according to their requirements (patented quick fixing for safe installation).
- One busbar for different networks and power levels – input module can be freely address.
- All other components are "hot swappable" in running operation.
- Mobile display for reading all MPX™ data on the rack.

- Optical slot space display (easy server slot space identification at the push of a button).

## Highest possible power levels in all areas with:

- Power illustration up to 28 kVA per bar and 55°C ambient temperature.
- Only one IP address for up to 4 bars with 24 modules.
- Plug&Play for numerous sensors.
- Extensive monitoring with a measuring accuracy of +/- 1% up to output level.
- Module and sensor auto-detect function with operating software.
- Lowest possible Liebert MPX™ system power loss.

## Ideal for blade servers and changing environments

Data centers work more and more with blade servers and require more processor power on low rack space; cabling must be simplified; power consumption must be reduced.

With the Liebert MPX™ the data center can quickly react to changes, which is why our product is the right choice for you infrastructure's administration.



#### INPUT POWER

- Configurable: 20 to 60 A (USA); 16 to 63 A (EU);
- Single-phase and three-phase
- Cable routing from above and below



#### OUTPUT DISTRIBUTOR

- Scalable, combination-compatible and swappable during operation
- Single-phase NEMA 5-20R, IEC-C13, IEC-C19, Schuko
- Load balance



#### MODULARITY

- Input modules
- Output modules
- External display
- External sensors



#### MONITORING

- Different levels: Input level, module level, output level
- Temperature and humidity
- Door contacts and floating break input contacts



#### REMOTE SOCKET CONTROL

- Socket level



#### LOCAL MONITORING

- Display for user
- Can also be mounted outside the rack



#### REMOTE MONITORING

- Secure web and SNMP interfaces
- Liebert Nform
- Avocent DSView



#### OVERLOAD PROTECTION

- Physically and electrically insulated circuit breakers for every socket module



#### RACK PDU ARRAY™

- One IP for up to 4 rack PDUs
- Liebert MPX™ and Liebert MPH™ in the same private network



#### FORM FACTOR

- Vertical mounting (0 U)
- Fits into trade standard 23/42 U racks and/or 800 mm wide racks



Do you like to be one step ahead of the next requirement? Liebert MPX™ lets you.



# Liebert MPX™: Four equipment models for different requirements

The Liebert MPX™ modular rack PDU consists of various modules. The foundation stone is a busbar, which is responsible for the power and communication distribution to the individual modules. The input power is routed via the Liebert MPX™ Power Entry Module (Liebert MPX™ PEM) to the Liebert MPX™ system. Different output modules (Liebert MPX™ Branch Receptacle Modules, Liebert MPX™ BRM) are available according to requirements. Four different variants can be set up depending on the equipment:

### 1. Liebert MPX™ Elementary

Modular basic power distribution without measurement and control function. An upgrade to another equipment model is no problem!

### 2. Liebert MPX™ Elementary Phase monitored

Modular power distribution with measurement on the input. An upgrade to the next higher line is possible by equipping with the respective output modules.

### 3. Liebert MPX™ Branch monitored

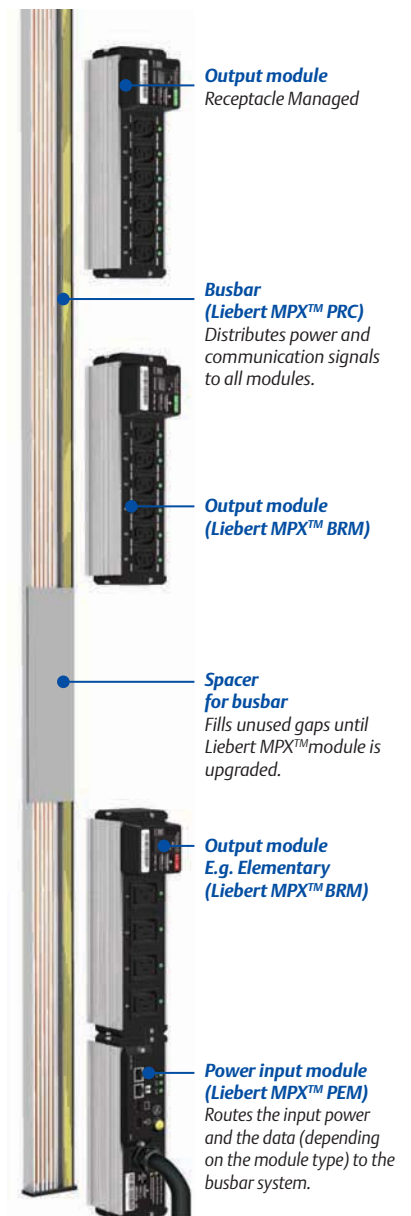
Modular power distribution with measurement on the input per output module.

An upgrade or downgrade to another line is possible by equipping with the respective output modules.

### 4. Liebert MPX™ Receptacle managed

Modular power distribution with measurement on the input per output module and per output. The individual outputs can also be switched on and off remotely. A downgrade to another line is possible by equipping with the respective output modules.

A combination of the "Elementary Phase monitored", "Branch monitored" and "Receptacle managed" lines on a shared busbar is also possible and is one of the exceptional features of the Liebert MPX™. Interfaces for the network communication, the sensors and/or the local display are provided by the Liebert Rack PDU Card (Liebert RPC) in the MPX™ PEM. The Liebert RPC Card enables connection to an optional RPC Basic Display Module (RPC BDM) to display the local status and alarms.





# Liebert MPX™, equipment models in Europe

			Four equipment models			
		Order number	Liebert MPX™ Elementary	Liebert MPX™ Elementary Phase monitored	Liebert MPX™ Branch monitored	Liebert MPX™ Receptacle managed
<b>Busbar</b>	Length 1035	MPXPRC-V1035XXX	x	x	x	x
	Length 1880	MPXPRC-V1880XXX	x	x	x	x
<b>Input modules</b>	1ph 32A fixed *	MPXPPEM-EHAEXQ30	x			
		MPXPPEM-EHAAXQ30		x	x	x
	3ph 16A fixed	MPXPPEM-EHAEXT30	x			
		MPXPPEM-EHAAXT30		x	x	x
	3ph 32A fixed	MPXPPEM-EHAEXR30	x			
		MPXPPEM-EHAAXR30		x	x	x
3ph 63A fixed	MPXPPEM-EHBEXZ30	x				
	MPXPPEM-EHBAXZ30		x	x	x	
<b>Output modules Elementary</b>	IEC-C13 L1	MPXB RM-EEBC7N1N	x	x		
	IEC-C13 L2	MPXB RM-EEBC7N2N	x	x		
	IEC-C13 L3	MPXB RM-EEBC7N3N	x	x		
	IEC-C19 L1	MPXB RM-EEBC4O1N	x	x		
	IEC-C19 L2	MPXB RM-EEBC4O2N	x	x		
	IEC-C19 L3	MPXB RM-EEBC4O3N	x	x		
	Schuko L1	MPXB RM-EEBC3P1N	x	x		
	Schuko L2	MPXB RM-EEBC3P2N	x	x		
Schuko L3	MPXB RM-EEBC3P3N	x	x			
<b>Output modules Branch monitored</b>	IEC-C13 L1	MPXB RM-EBBC6N1N			x	
	IEC-C13 L2	MPXB RM-EBBC6N2N			x	
	IEC-C13 L3	MPXB RM-EBBC6N3N			x	
	IEC-C19 L1	MPXB RM-EBBC4O1N			x	
	IEC-C19 L2	MPXB RM-EBBC4O2N			x	
	IEC-C19 L3	MPXB RM-EBBC4O3N			x	
	Schuko L1	MPXB RM-EBBC3P1N			x	
	Schuko L2	MPXB RM-EBBC3P2N			x	
Schuko L3	MPXB RM-EBBC3P3N			x		
<b>Output modules Receptacle managed</b>	IEC-C13 L1	MPXB RM-ERBC6N1N				x
	IEC-C13 L2	MPXB RM-ERBC6N2N				x
	IEC-C13 L3	MPXB RM-ERBC6N3N				x
	IEC-C19 L1	MPXB RM-ERBC4O1N				x
	IEC-C19 L2	MPXB RM-ERBC4O2N				x
	IEC-C19 L3	MPXB RM-ERBC4O3N				x
	Schuko L1	MPXB RM-ERBC3P1N				x
	Schuko L2	MPXB RM-ERBC3P2N				x
Schuko L3	MPXB RM-ERBC3P3N				x	
<b>Sensors</b>	1xTemp.	SN-Z01		x	x	x
	3xTemp.	SN-Z02		x	x	x
	3xT. + 1xHum	SN-Z03		x	x	x
	1xTemp. Mod.	SN-T		x	x	x
	Temp/Hum Mod.	SN-TH		x	x	x
	2xDoor Mod.	SN-2D		x	x	x
	3xInput Mod.	SN-3C		x	x	x
<b>Display ext.</b>		RPCBDM-1000		x	x	x

Upgrade possible!

Different combinations possible!

\* When using 1ph input modules then only L1 output modules can be equipped.



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## Liebert MPX™ input module/power supply

### Elementary and Monitored type:

- The MPX PEM is fixed on the MPX PRC and provides the connection to the power supply.
- Cable is connected fixed, 3 m long
- With IEC60309 plug, 1Ph/N/PE 6h blue, 3Ph/N/PE 6h red.

### Monitored type:

- The MPX PEM provides the connection to the databus for the data communication.
- Integrated Liebert RPC-1000 communication card enables remote monitoring and maintenance of MPX units.
- Provides the following measured values of the phase inputs: effective power, current, voltage, frequency and consumption.
- Power alarm functions for the individual phases and their operating status are also supported.
- Further important features: three displays inform the user about the current status of each individual input. An acoustic alarm is activated with specific overload conditions.
- The communication card centralizes the Liebert MPX's local and remote administration.
- There is administration via web and SNMP for systems connected to the Ethernet.
- Also serves as the connection point for versatile support options and devices, such as the display module (RPC BDM), various sensors and connection to other Liebert MPX™ or Liebert MPH™ systems, for example.
- Has RJ-45 ports for all connections and does not require any special cabling.
- Supports 10 and 100 MBit Ethernet and provides on-site firmware upgrade.

### Technical data

#### Interfaces:

- RJ-45 LAN port (10/100 MBit) – for connecting to the local network (LAN) via an Ethernet cable.

- Expansion/administration port for local configuration using a computer/laptop, for setting up a link-up of several PDUs (Liebert MPX™ or MPH™).
- Display port for connecting the RPC BDM (display module).
- External sensor port for connecting optional sensors.

### Supported technologies:

- Web support, provides Liebert MPX™ control and management. Authorized users can view status information on their network.
- SNMP support, provides Liebert MPX™ SNMP management.
- Easy integration into Liebert Nform, Avocent DSView and Nagios.

### Material/finish

Housing: Aluminum  
Cover: Sheet steel  
Power contacts: Silvered  
Databus contacts: Gilded (only Monitored type)

### Dimensions

Width: 75 mm  
Height: 65 mm  
Cable: 3 m

### Color

Housing: Aluminum/RAL7021 dark gray

### Approvals

- CE Symbol in accordance with Low Voltage Directive, 2006/95/EC
- EMC Directive 2004/108/EC
- BV GS

### Supply schedule

1 MPX PEM power input module  
incl. connection cable  
incl. RPC-1000 communication card (only Monitored type)

L	W	H	U	Feed	Load rating	Type	Order no.	UP
220	75	65		Fixed	230VAC, max 32A	Elementary	MPXPPEM-EHAEXQ30	1 unit
220	75	65		Fixed	230/400VAC, max 16A	Elementary	MPXPPEM-EHAEXT30	1 unit
220	75	65		Fixed	230/400VAC, max 32A	Elementary	MPXPPEM-EHAEXR30	1 unit
266	75	65		Fixed	230/400VAC, max 63A	Elementary	MPXPPEM-EHBEXZ30	1 unit
220	75	65		Fixed	230VAC, max 32A	Monitored	MPXPPEM-EHAAXQ30	1 unit
220	75	65		Fixed	230/400VAC, max 16A	Monitored	MPXPPEM-EHAAXT30	1 unit
220	75	65		Fixed	230/400VAC, max 32A	Monitored	MPXPPEM-EHAAXR30	1 unit
266	75	65		Fixed	230/400VAC, max 63A	Monitored	MPXPPEM-EHBAXZ30	1 unit

Dimensions in mm: L = Length, W = Width, H = Height, S = Switch, n = Number of sockets, F1 = Standard side, F2 = Design side, 19" = Suitable for 19" installation, Safe = Child-safe, U = Standard height unit, UP = Unit of packaging.

= Express item

Conversion: 1 mm = 0.03937 inch      1 kg = 2.2046 pound

Replace .x with the number of your color combination:  
.1 = RAL 7035, .6 RAL 7035/RAL 2003



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## Liebert MPX™ BRM Output Module

- The MPX BRM takes care of the power distribution to the individual consumers.
- Each module taps a phase; this is color-identified on the module.
- All modules are protected against overload with a 20A circuit breaker.
- Changing the modules during operation enables a user-defined installation, without having to shut down the Liebert MPX™.
- Up to 3 BRM output modules can be installed on a 1,035 mm long PRC busbar, and up to 6 can be installed on a 1,880 mm long PRC busbar.
- The MPX BRMs have an LED-ID indicator, which clearly identifies every module with a number.
- The modules are administered in the software.
- Provide the following measured values: voltage, power, current, apparent power, kWh, frequency, power factor and crest factor.
- Power alarm functions and the operating status are supported.
- The individual outputs can be switched on and off remotely.

### Type E - Elementary:

- Module for power distribution via respective outputs.

### Type B – Branch monitored:

- Module for power distribution via respective outputs with measurement function on module level.
- The MPX BRMs have an LED-ID indicator, which clearly identifies every module with a number.
- The modules are administered in the software
- Provide the following measured values: voltage, power, current, apparent power, kWh and power factor.
- Power alarm functions and the operating status are supported.

### Type R – Receptacle managed:

- Module for power distribution via respective outputs with measurement function on Module level and output level.

### Material/finish

Housing: Aluminum  
Cover: Sheet steel  
Power contacts: Silvered  
Databus contacts: Gilded (type B and R only)

### Dimensions

Width: 75 mm  
Height: 65 mm

### Color

Housing: Aluminum/RAL7021 dark gray

### Approvals

- CE label in accordance with Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- BV GS

### Supply schedule

1 MPX™ BRM Output Module

L	n	Outputs	Load rating per output	Phase tapping	Type	Order no.	UP
266	7	IEC320 C13	10A	L1	E	MPXBRM-EEBC7N1N	1 unit
266	7	IEC320 C13	10A	L2	E	MPXBRM-EEBC7N2N	1 unit
266	7	IEC320 C13	10A	L3	E	MPXBRM-EEBC7N3N	1 unit
266	4	IEC320 C19	16A	L1	E	MPXBRM-EEBC4O1N	1 unit
266	4	IEC320 C19	16A	L2	E	MPXBRM-EEBC4O2N	1 unit
266	4	IEC320 C19	16A	L3	E	MPXBRM-EEBC4O3N	1 unit
266	3	Schuko CEE 7/4	16A	L1	E	MPXBRM-EEBC3P1N	1 unit
266	3	Schuko CEE 7/4	16A	L2	E	MPXBRM-EEBC3P2N	1 unit
266	3	Schuko CEE 7/4	16A	L3	E	MPXBRM-EEBC3P3N	1 unit
266	6	IEC320 C13	10A	L1	B	MPXBRM-EBBC6N1N	1 unit
266	6	IEC320 C13	10A	L2	B	MPXBRM-EBBC6N2N	1 unit
266	6	IEC320 C13	10A	L3	B	MPXBRM-EBBC6N3N	1 unit
266	4	IEC320 C19	16A	L1	B	MPXBRM-EBBC4O1N	1 unit
266	4	IEC320 C19	16A	L2	B	MPXBRM-EBBC4O2N	1 unit
266	4	IEC320 C19	16A	L3	B	MPXBRM-EBBC4O3N	1 unit
266	3	Schuko CEE 7/4	16A	L1	B	MPXBRM-EBBC3P1N	1 unit
266	3	Schuko CEE 7/4	16A	L2	B	MPXBRM-EBBC3P2N	1 unit
266	3	Schuko CEE 7/4	16A	L3	B	MPXBRM-EBBC3P3N	1 unit
266	6	IEC320 C13	10A	L1	R	MPXBRM-ERBC6N1N	1 unit
266	6	IEC320 C13	10A	L2	R	MPXBRM-ERBC6N2N	1 unit
266	6	IEC320 C13	10A	L3	R	MPXBRM-ERBC6N3N	1 unit
266	4	IEC320 C19	16A	L1	R	MPXBRM-ERBC4O1N	1 unit
266	4	IEC320 C19	16A	L2	R	MPXBRM-ERBC4O2N	1 unit
266	4	IEC320 C19	16A	L3	R	MPXBRM-ERBC4O3N	1 unit
266	3	Schuko CEE 7/4	16A	L1	R	MPXBRM-ERBC3P1N	1 unit
266	3	Schuko CEE 7/4	16A	L2	R	MPXBRM-ERBC3P2N	1 unit
266	3	Schuko CEE 7/4	16A	L3	R	MPXBRM-ERBC3P3N	1 unit



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## Liebert MPX™ PRC - Power Distribution Unit/Communication Bus

- The MPX PRC is the foundation stone of the Liebert MPX PDU.
- Power and data transfer buses are integrated fixed over the entire length of the MPX PRC.
- The MPX BRMs (output modules) and the MPX PEM (Power Entry Module) are fixed on the MPX PRC and depending on the type take care of the modules' power feed, output, monitoring and management.

**Material/finish**  
 Busbar housing: Aluminum  
 Busbars: Copper  
 Databus: Gilded

**Dimensions**  
 Width: 68 mm  
 Height: 24 mm

**Color**  
 Housing: Aluminum


**Approvals**  
 - CE Symbol in accordance with Low Voltage Directive, 2006/95/EC  
 - EMC Directive 2004/108/EC  
 - BV GS

**Load rating**  
 Max. current intensity: 3 x 63 A  
 Nominal voltage (L-N / L-L): 230 / 400 VAC

**Supply schedule**  
 1 MPX PRC - Power Distribution Unit/  
 Communication Bus  
 1 mounting set

L	W	H	U	Model	Order no.	UP
1035	68	24	23	1 PEM (220mm) + 3 BRM	<b>MPXPRC-V1035XXX</b>	1 unit
1880	68	24	42	1 PEM (220/266mm) + 6 BRM	<b>MPXPRC-V1880XXX</b>	1 unit

Dimensions in mm: L = Length, W = Width, H = Height, S = Switch,  
 n = Number of sockets, F1 = Standard side, F2 = Design side, 19" = Suitable  
 for 19" installation, Safe = Child-safe, U = Standard height unit, UP = Unit of  
 packaging.

 = Express item

Conversion: 1 mm = 0.03937 inch      1 kg = 2.2046 pound

Replace .x with the number of your color combination:  
 .1 = RAL 7035, .6 = RAL 7035/RAL 2003



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## Liebert MPX™/MPH™ - Sensors

- The sensors are designed for tool-less installation in a Knürr Miracel Rack, but they can also be installed in any other rack.
- "Fixed" type sensors are fixed to a cable.
- "Modular" type sensors can be connected with the delivered cable.
- Are affixed to the RPC-1000 communication card.
- Several sensors can be connected in rows (max. length: 20 m).
- Are automatically displayed in the Liebert MPX™/MPH™ software.
- Temperature measuring range: 5-55°C
- Accuracy: +/- 5%
- Humidity measuring range: 10 – 95%
- Accuracy: +/- 3.5%

**Note**  
The sensors are not required for operating the Liebert MPX™ or MPH™, but they require the Liebert RPC-1000 (communication card)

**Supply schedule**  
1 sensor with connection cable

Cable length	Type	Model	Order no.	UP
3660	Fixed	Single temp. sensor	SN-Z01	1 unit
5180	Fixed	Triple temp. sensor	SN-Z02	1 unit
5180	Fixed	Triple temp. sensor + single humidity	SN-Z03	1 unit
2000	Modular	Single temp. sensor	SN-T	1 unit
2000	Modular	Triple temp. sensor + single humidity	SN-TH	1 unit
2000	Modular	2 x door contact - input module*	SN-2D	1 unit
2000	Modular	3 x digital input	SN-3C	1 unit

\* Suitable door contact switch: Order no.: 06.108.115.9



DOS20153

## Liebert RPC BDM - 1000 Display Module

- Provides the local display of the monitored data for all connected Liebert MPX™ and Liebert MPH™ systems.
- Operated with the aid of a navigation switch.
- Connected via a cable with the Liebert RPC, which provides the user the option of placing the displays where they can be easily read in accordance with the local space conditions.
- An individual display can be used for up to four the Liebert MPX™ Liebert MPH™ PDUs, which are connected to a PDU array.

**Note**  
The Display Module is not required for operating the Liebert MPX™ or MPH™, but it requires the Liebert RPC-1000 (communication card).

**Supply schedule**  
1 RPCBDM-1000 Display Module  
1 connection cable, 2 m  
1 mounting set

L	W	H	U	Model	Order no.	UP
					RPCBDM-1000	1 unit



# Liebert MPH™ Managed Rack PDU: Systems monitoring and control

Liebert MPH™ Managed Rack PDU is a power supply system with monitoring and control functions. The housing consists of a robust sheet steel enclosure, so that the PDU can be easily installed in a Knürr rack, or even into other enclosure systems.

The Liebert MPH™ can be installed vertically or horizontally (19"), depending on the type. The PDU is delivered pre-installed with the same communication card (RPC-1000) as the Liebert MPX™. All Liebert MPX™ external modules can therefore be connected (e.g. sensors, display module). Up to four Liebert MPX™/MPH™ can be connected as rack PDU array to consolidate the user's IP connection and the device monitoring.

Liebert MPH™ is available in two equipment models:

## 1: Liebert MPH™ Type RM

The Liebert MPH™ Type RM is a monitored PDU that monitors the phase inputs. Measured per phase are: power, current, voltage and consumption. The current is also monitored per group (only 32A model). Different threshold values enable detailed alarm signals.

## 2: Liebert MPH™ Type C

The Liebert MPH™ Type C can also switch the individual outputs on and off remotely.

### Highest possible security and availability with:

- Power illustration up to 22 kVA per PDU and 55°C ambient temperature.
- N-conductor current display with 3-phase feed, which prevents an overload on the feed cable.
- Overload protection can be extended per group with all 32A models, minimizes danger with cascaded PDU overload.
- Setting alarm threshold values, which means possible failures are already identified early on.

### Flexibility with:

- Connection option for an external display, which can be easily mounted and also combined with the Liebert MPX™.
- Connection option for external sensors, which means temperatures and humidity can be monitored.

- Doors and alarm contacts can also be monitored and displayed via external input address.
- Versatile installation in the rack as 19" or space-saving vertical installation.
- Same, compatible monitoring platform for Liebert MPH™ and Liebert MPX™.

### Low operating costs:

- Rack PDU array setup, which means up to 4 MPH/MPX can be controlled with one IP address; the installation is quicker and easier.
- Extensive energy and power measurement, which provides data that is required for maximizing the power and cooling infrastructure.
- Special switching technology of the individual sockets, which reduces the rack PDU's power loss.
- Data interface with http and https protocol; no external software required for configuration and monitoring. The PDU can, however, also be integrated via SNMP into other management addresses.

**INPUT POWER**

- 20 to 30 A (USA);
- 16 to 32 A (EU);
- Single-phase and three-phase

**OUTPUT DISTRIBUTOR**

- NEMA 5-20R single-phase,
- IEC-C13 and IEC-C19;
- combination systems

**MODULARITY**

- Communication card
- External display
- External sensors

**MONITORING**

- Input level
- Group level depending on type
- Temperature and humidity
- Door contacts and floating break input contacts

**REMOTE SOCKET CONTROL**

- Socket level

**LOCAL MONITORING**

- Display for user
- Can also be mounted outside the rack

**REMOTE MONITORING**

- Secure web and SNMP interfaces
- Liebert Nform
- Avocent DSView

**OVERLOAD PROTECTION**

- Circuit breakers for every group

**RACK PDU ARRAY™**

- One IP for up to 4 rack PDUs
- Liebert MPX™ and Liebert MPH™ in the same private network

**FORM FACTOR**

- Vertical mounting (0 U)
- Rack installation
- Slimline 0 U form factor for positioning two PDUs in just one rack



Liebert MPH™ Managed Rack PDU is used for easy monitoring and controlling of the power supply in server racks.



DOS20153

## Liebert MPH™ Rack PDU

- The Liebert MPH™ Type RM is a monitored PDU that monitors the phase inputs. Measured per phase are: power, current, voltage and consumption. The current per group is also monitored (only 32 A version).
- The Liebert MPH™ Type C can also switch the individual outputs on and off remotely.
- Integrated Liebert RPC-1000 communication card enables remote monitoring and maintenance of MPH units.
- The RPC-1000 enables the interconnection of several MPH or MPX units and the connection of Liebert MPH™ with the Liebert MPX™ units for monitoring and administration.
- The Liebert MPH™ can be monitored directly on-site with the RPC BDM-1000, an optional display module that is connected directly with the communication card.
- The monitoring unit can be flexibly mounted on the rack.

### Material/finish

Housing: Sheet steel extrusion

### Dimensions

Width: 50 mm (vertical), 483 mm (19")  
Height: 80 mm (vertical), 44 mm (19")  
Cable: 3 m

### Color

Housing: RAL7021 dark gray

### Approvals

- CE Symbol in accordance with Low Voltage Directive, 2006/95/EC
- EMC Directive 2004/108/EC
- GS

### Supply schedule

1 Liebert MPH™ Socket Strip (PDU)  
1 mounting brackets  
incl. RPC-1000 communication card

L	Type	Input values	Input plug	Outputs IEC320	Order no.	UP
438*	RM	230Vac, 16A	IEC320-Sheet I	9xC13	MPH-EBR09NXXO30	1 unit
438*	RM	230Vac, 32A	IEC60309 1ph/N/PE 6h	9xC13	MPH-EBR09NXXQ30	1 unit
1730	RM	230Vac, 16A	IEC320-Sheet I	27xC13	MPH-EBV27NXXO30	1 unit
1730	RM	230Vac, 16A	IEC320-Sheet I	21xC13/6xC19	MPH-EBV27NOXO30	1 unit
1730	RM	230Vac, 32A	IEC60309 1ph/N/PE 6h	21xC13/6xC19	MPH-EBV27NOXQ30	1 unit
1730	RM	230Vac, 32A	IEC60309 1ph/N/PE 6h	27xC13	MPH-EBV27NXXQ30	1 unit
1730	RM	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	27xC13	MPH-EBV27NXXT30	1 unit
1730	RM	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	21xC13/6xC19	MPH-EBV27NOXT30	1 unit
1730	RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	27xC13	MPH-EBV27NXXR30	1 unit
1730	RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	21xC13/6xC19	MPH-EBV27NOXR30	1 unit
438*	C	230Vac, 16A	IEC320-Sheet I	9xC13	MPH-ECR09NXXO30	1 unit
438*	C	230Vac, 32A	IEC60309 1ph/N/PE 6h	9xC13	MPH-ECR09NXXQ30	1 unit
1730	C	230Vac, 16A	IEC320-Sheet I	27xC13	MPH-ECV27NXXO30	1 unit
1730	C	230Vac, 16A	IEC320-Sheet I	21xC13/6xC19	MPH-ECV27NOXO30	1 unit
1730	C	230Vac, 32A	IEC60309 1ph/N/PE 6h	21xC13/6xC19	MPH-ECV27NOXQ30	1 unit
1730	C	230Vac, 32A	IEC60309 1ph/N/PE 6h	27xC13	MPH-ECV27NXXQ30	1 unit
1730	C	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	27xC13	MPH-ECV27NXXT30	1 unit
1730	C	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	21xC13/6xC19	MPH-ECV27NOXT30	1 unit
1730	C	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	27xC13	MPH-ECV27NXXR30	1 unit
1730	C	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	21xC13/6xC19	MPH-ECV27NOXR30	1 unit

\*(19")

Dimensions in mm: L = Length, W = Width, H = Height, S = Switch,  
n = Number of sockets, F1 = Standard side, F2 = Design side, 19" = Suitable  
for 19" installation, Safe = Child-safe, U = Standard height unit, UP = Unit of  
packaging.

= Express item

Conversion: 1 mm = 0.03937 inch      1 kg = 2.2046 pound

Replace .x with the number of your color combination:  
.1 = RAL 7035, .6 RAL 7035/RAL 2003





DOS20153

## Liebert MPX™/MPH™ - Sensors

- The sensors are designed for tool-less installation in a Knürr Miracel Rack, but they can also be installed in any other rack.
- "Fixed" type sensors are fixed to a cable.
- "Modular" type sensors can be connected with the delivered cable.
- Are affixed to the RPC-1000 communication card.
- Several sensors can be connected in rows (max. length: 20 m).
- Are automatically displayed in the Liebert MPX™/MPH™ software.
- Temperature measuring range: 5-55°C
- Accuracy: +/- 5%
- Humidity measuring range: 10 – 95%
- Accuracy: +/- 3.5%

### Note

The sensors are not required for operating the Liebert MPX™ or MPH™, but they require the Liebert RPC-1000 (communication card)

### Supply schedule

1 sensor with connection cable  
Operating instructions

Cable length	Type	Model	Order no.	UP
3660	Fixed	Single temp. sensor	SN-Z01	1 unit
5180	Fixed	Triple temp. sensor	SN-Z02	1 unit
5180	Fixed	Triple temp. sensor + single humidity	SN-Z03	1 unit
2000	Modular	Single temp. sensor	SN-T	1 unit
2000	Modular	Triple temp. sensor + single humidity	SN-TH	1 unit
2000	Modular	2 x door contact - input module*	SN-2D	1 unit
2000	Modular	3 x digital input	SN-3C	1 unit

\* Suitable door contact switch: Order no.: 06.108.115.9



DOS20153

## Liebert RPC BDM - 1000 Display Module

- Provides the local display of the monitored data for all connected Liebert MPX™ and Liebert MPH™ systems.
- Operated with the aid of a navigation switch.
- Connected via a cable with the Liebert RPC, which provides the user the option of placing the displays where they can be easily read in accordance with the local space.
- An individual display can be used for up to four the Liebert MPX™ Liebert MPH™ PDUs, which are connected to a PDU array.

### Note

The Display Module is not required for operating the Liebert MPX™ or MPH™, but it requires the Liebert RPC-1000 (communication card)

### Supply schedule

1 RPCBDM-1000 Display Module  
1 connection cable, 2 m  
1 mounting set  
Operating instructions

L	W	H	U	Model	Order no.	UP
					RPCBDM-1000	1 unit

# Accessories and software application, Liebert MPX™ and Liebert MPH™

## Infrastructure management



### Secure web and SNMP interfaces

- User-configured alarm threshold (3 threshold values per measuring point).
- Socket status and delayed switching.
- Electrical measurement: V, A, kW and kW/h, power factor, Hz, Crest factor.
- Rack PDU array: equipment consolidation.
- PDU Explorer: intuitive hierarchical interface.
- PDU status display according to strip or socket.
- Device Explorer: search according to user-defined device names.
- Environment monitoring: temperature and humidity, floating contacts.



### Liebert Nform

- Control technology for Liebert devices in the LAN.
- E-mail alarm and local notifications.
- Scalable software solution for the IT environment.



### Avocent Rack Power Manager

- Alarm and incident administration of all equipment at the site.
- Control technology in real-time.
- Individually adjustable user interface.
- Trend and alarm reports.



### Web-based monitoring

- PDU parameters monitoring via the web browser.
- No application-specific software required.
- Simultaneous display of up to 4 PDUs.



### Network management system

- Open standard solution.
- For all SNMP devices.
- Scalable software solution for all company sizes.

## Optional hardware



### Local display module – RPC-BDM

- Electrical and ambient parameters.
- 1 RPC-BDM for up to 4 PDUs in the array.
- PDU Explorer.
- Device Explorer.

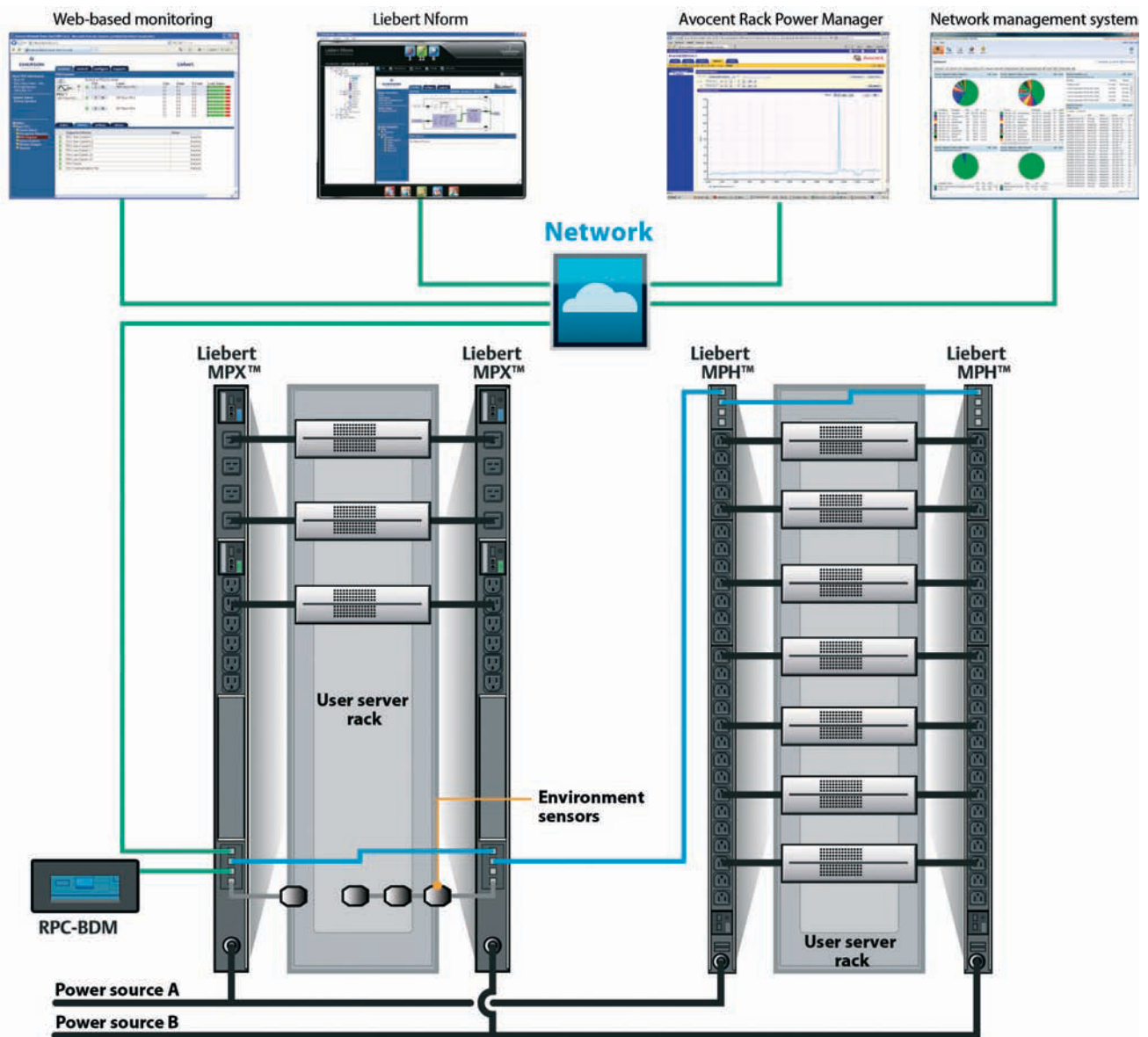


### Liebert SN product family: Rack Sensors

- Temperature measurement with single or multiple sensors.
- Temperature and humidity measurement with multiple sensors.
- Door contact sensors and floating input contacts.

# Flexible power distribution

Easy integration of the rack PDUs into new or existing management platforms



Rack PDU array (up to four systems)



# Knürr DI-STRIP®

## Basic Rack PDU: Robust PDUs with helpful equipment features

Knürr's Basic Rack PDUs are the solution for every data center looking for robust, economical and flexible rack concepts.

For power distribution the Knürr DI-STRIP® product family meets the requirements of numerous IT applications and other areas. Specially configured for the growing number of electronic components in network switching racks of server racks. Available with different accessories, such as circuit breakers, surge protection, mains filter, master-slave function, emergency off button, fault current circuit breaker, local and remote power measurement, for example.

### Highest possible security and availability with:

- Closed sheet steel extrusion, which means high stability and torsional strength.
- Extensive certification in acc. with international standard.
- Double spring contacts for shock hazard-proof and low contact resistance.
- Unbalanced load monitoring with 3-phase feed prevents overload on the feed cable (only DI-STRIP versions M and RM).
- Optimum load monitoring with installation of the servers (only DI-STRIP versions M and RM).
- Individual outputs backup with the DI-STRIP BladePower and Pizza Power.

### Maximum flexibility with:

- Configurations and options with international compatibility.

- 2.5 m or 4 m long mains cable for more spatial flexibility.
- Rotating display in 90° steps (only DI-STRIP versions M and RM).
- Tool-less installation, which means quick and easy extension in the rack (only DI-STRIP HighPower).

### Extremely low operating costs with:

- Quick and easy installation on the rack requires minimum space and shorter installation time.
- Automatic background light reduction extends the display's service life and reduces the rack PDU power loss (only DI-STRIP models M and RM).
- Especially flat housing extrusion, providing full accessibility to the 19" level with 600 mm wide server racks.



All DI-STRIP M / RM with display rotation for better reading.



#### INPUT POWER

- Single-phase or three-phase
- Up to 22 kVa
- Easy input supply



#### OUTPUT DISTRIBUTOR

- NEMA 5-20R single-phase, IEC-C13 and C19, combination systems
- Schuko, France, Switzerland



#### MODULARITY

- More connectivity with expansion unit for Basic Rack PDU GST18-PDUs



#### FORM FACTOR

- Vertical mounting (0 U)
- Rack installation



#### LOCAL MONITORING

- Fixed display



#### REMOTE MONITORING

- Secure web and SNMP interfaces Liebert Nform



#### OVERLOAD PROTECTION

- Circuit breakers/fuses per branching cable/output as required



Knürr DI-STRIP® – equipped for operational reliability with all certificates.

# Knürr DI-STRIP®:

## Three equipment models for precisely your requirements

**Knürr DI-STRIP® Elementary:** Basic Rack PDU, Knürr DI-Strip Elementary® for simple power distribution requirements. The PDUs are available in different structures, depending on the rack installation requirements. Additional functions such as surge protection, mains filter, master-slave function, emergency off button and fault current circuit breaker are also possible.



*All DI-STRIP HighPower are equipped with especially flat housing extrusions and side cable entry. This enables installation without any loss of usable height units and cable entry from above and below. Full accessibility to the 19" level with 600 mm wide server racks is also a given.*

**Knürr DI-STRIP M® – local metered:** Basic Rack PDU Knürr DI-STRIP M® for simple power distribution requirements and local power measurement for your data center. Available in single and three-phase versions up to 22 kVa, with and without power measurement. Local power measurement module features:

#### Local power measurement features:

- M = power measurement (local).
- Tried, tested and proven DI-STRIP® PDU with integrated local power measurement module.
- Large transparent LCD display.
- Meets the strictest EMC requirements with radiation and irradiation interference.
- Integrated unbalanced load monitoring with three-phase feed.
- Rotatable displays in 90° steps.
- Automatic background light reduction.
- Optimum load monitoring with installation of the servers.

**Knürr DI-STRIP RM® – remote metered:** Basic Rack PDU Knürr DI-STRIP RM® for simple power distribution requirements and remote power measurement for your data center. Available in single and three-phase versions up to 22 kVa, with local and remote power measurement. Knürr DI-STRIP RM® provides safe and reliable power supply in a robust, extruded enclosure.

#### Remote power measurement module features:

- RM = power measurement (remote)
- Tried, tested and proven DI-STRIP® PDU with integrated power measurement module with remote monitoring.
- Large transparent LCD display.
- Meets the highest EMC requirements with radiation and irradiation interference.
- Can be set for up to 3 threshold values and unbalanced load monitoring.
- Rotatable displays in 90° steps.
- Automatic background light reduction.
- Protocols: HTTP, SNMP, Syslog.

# Knürr DI-Strip<sup>®</sup>, equipment models in Europe

## Full overview:



Example: Model



Example: Model



Example: Model

			Knürr DI-STRIP <sup>®</sup> - Equipment models		
Options	Input power	Outputs	Knürr DI-Strip Elementary <sup>®</sup>	Knürr DI-Strip M <sup>®</sup> local metered	Knürr DI-Strip RM <sup>®</sup> remote metered
<b>1</b> Euro Plug System IEC 320	1x16A up to 3.68kVA	IEC60320 C13 & C19	x	x	x
<b>1</b> Classic	1x16A up to 3.68kVA	Schuko, France, Switzerland	x		
<b>1</b> Compact	1x16A up to 3.68kVA	Schuko, France, Switzerland	x	x	x
<b>1</b> Protector FI	1x16A up to 3.68kVA	Schuko, France, Switzerland	x		
<b>1</b> Protector LS	1x16A up to 3.68kVA	Schuko, France, Switzerland	x		
<b>1</b> Protector FI / LS	1x16A up to 3.68kVA	Schuko, France, Switzerland	x		
<b>1</b> Protector Emergency STOP	1x16A up to 3.68kVA	Schuko, France	x		
<b>1</b> Protector Emergency STOP FI/LS	1x16A up to 3.68kVA	Schuko, France	x		
<b>1</b> Power Cleaner	1x16A up to 3.68kVA	Schuko, France	x		
<b>1</b> Safety Basic	1x16A up to 3.68kVA	Schuko, France, Switzerland	x		
<b>1</b> Safety Standard	1x16A up to 3.68kVA	Schuko, France, Switzerland	x		
<b>1</b> Master Slave	1x16A up to 3.68kVA	Schuko, France	x		
<b>1</b> Combi	1x16A up to 3.68kVA	Schuko, France	x		
<b>1</b> GST18 Plug System	1x16A, 3x16A up to 11kVA	Schuko, France IEC60320	x	x	x
<b>1</b> TriplePower	3x16A up to 11kVA	IEC60320 C13 & C19 Schuko	x	x	x
<b>2</b> BladePower	1x32A, 3x32A up to 22kVA	IEC60320 C13 & C19	x		
<b>2</b> PizzaPower	1x32A, 3x32A up to 22kVA	IEC60320 C13 & C19 Schuko	x	x	x
<b>3</b> HighPower	1x32A, 3x32A up to 22kVA	IEC60320 C13 & C19	x		x

# Knürr DI-Strip® – for server applications



DOS20153

## Knürr DI-STRIP® HighPower

- Flat design provides access to the 19" level, even with 600 mm wide racks.
- Individual backup for outputs (groups with 10 A).
- Outputs divided into groups with max. 20 A per group.
- Modular expansion in the rack with tool-less PDU installation.

Additional function for HighPower RM type (remote metered).

- With big transparent LCD display.
- Effective value display of alternating power input.
- LCD display rotation in 90° steps.
- Display can be switched bright or dark.
- Load changes signaling.
- Automatic background light reduction.
- Technical description for data interface (see DI-STRIP RM).

### Material/finish

Housing: Sheet steel, zinc-passivated, powder-coated

### Dimensions

Width: 134 mm  
Height: 47 mm  
Cable: 3 m

### Color

Housing: RAL 9005 black

### Approvals


- CE Symbol in accordance with Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- GS

### Supply schedule

- 1 socket strip (PDU)
- 1 integrated remote ampere meter (only HighPower RM)
- 2 mounting brackets
- Operating instructions

L	Type	Input values	Input plug	Outputs IEC60320			Order no.	UP
				C13	C19	Schuko		
540	DI-STRIP® HighPower	230Vac, 32A	IEC60309 1ph/N/PE 6h	20	4		<b>03.632.100.8</b>	1 unit
850	DI-STRIP® HighPower	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	6	12		<b>03.632.102.8</b>	1 unit
850	DI-STRIP® HighPower	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	18	6		<b>03.632.103.8</b>	1 unit
540	DI-STRIP® HighPower RM	230Vac, 32A	IEC60309 1ph/N/PE 6h	20	4		<b>03.632.200.8</b>	1 unit
850	DI-STRIP® HighPower RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	6	12		<b>03.632.202.8</b>	1 unit
850	DI-STRIP® HighPower RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	18	6		<b>03.632.203.8</b>	1 unit

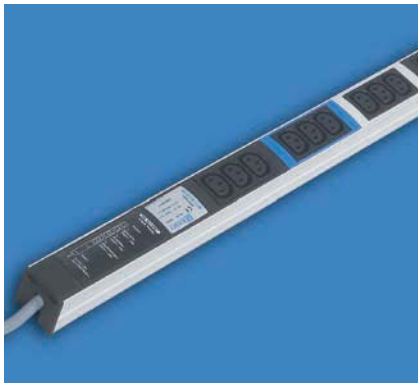
Dimensions in mm: L = Length, W = Width, H = Height, S = Switch,  
n = Number of sockets, F1 = Standard side, F2 = Design side, 19" = Suitable  
for 19" installation, Safe = Child-safe, U = Standard height unit, UP = Unit of  
packaging.

 = Express item

Conversion: 1 mm = 0.03937 inch      1 kg = 2.2046 pound

Replace .x with the number of your color combination:  
.1 = RAL 7035, .6 = RAL 7035/RAL 2003





DOS20126

## DI-STRIP® TriplePower® Euro Socket System IEC 320 with cable

- Cable: H05VV-F 3G 2.5 mm<sup>2</sup>.
- Cable: 2.5 m (optional with IEC60309 plug, 3Ph/N/PE 6h).
- Easy mounting on the rack extrusion.
- 3x16A feed as standard.
- Ideal for providing redundancies (e. g. 96 A with redundant feed).
- Unmistakable phase assignment color-coding.
- Optimum distribution over the entire rack height (23 U or 41 U).
- Alternative to 3-phase GST18 system (see page 170).

**Material/finish**  
Housing: Closed sheet steel extrusion, zinc-passivated, powder-coated texture  
Plastic parts: Vampamid 6 0024 VO (UL94), recyclable

**Dimensions**  
Height: 45.5 mm  
Housing width: 44.4 mm (= 1 U)

**Approvals/certificates**  
- CE label in accordance with Low Voltage Directive 2006/95/EC  
- EMC Directive 2004/108/EC  
- BV GS, CSA NRTL/C, CB-scheme

**Color**  
Housing: RAL7035 light gray  
Plastic parts: RAL7021 dark gray

**Load rating**  
100-240/173-415 Vac  
Input: 3x 16 A  
Output: 10A (C13)  
Output: 16 A (C19)

**Approval symbols for IEC 320 3-way Euro combinations**  
VDE, UR, CSA

**Supply schedule**  
1 socket strip  
2 mounting brackets

L	S	n	F1	19"	Input values	Input plug	Outputs IEC60320		Order no.	UP
							C13	C19		
1033		24	●		230/400Vac, 16A	Open end	24		03.600.024.1	1 unit
1833		48	●		230/400Vac, 16A	Open end	48		03.600.048.1	1 unit
1033		24	●		230/400Vac, 16A	IEC60309 3ph/N/PE 6h	24		03.600.824.1	1 unit
1833		48	●		230/400Vac, 16A	IEC60309 3ph/N/PE 6h	48		03.600.848.1	1 unit
1133		24	●		230/400Vac, 16A	IEC60309 3ph/N/PE 6h	18	6	03.600.524.1	1 unit
1733		42	●		230/400Vac, 16A	IEC60309 3ph/N/PE 6h	36	6	03.600.542.1	1 unit
483		6	●	●	230/400Vac, 16A	IEC60309 3ph/N/PE 6h		6	03.600.506.1	1 unit



DOS20153

## Knürr DI-STRIP® BladePower® Technical data

- EC 320 sockets (10 A and 16 A).
- Individually fused via thermal circuit breaker that can be reset in acc. with IEC60934.
- Cable: H05VV-F 3G 4 mm<sup>2</sup>.
- Cable: 4 m.
- With IEC60309 plug, 1Ph/N/PE 6h blue, 3Ph/N/PE 6h red.

**Material / Surface**  
Housing: Sheet steel, zinc-passivated, powder-coated

**Dimensions**  
Height: approx. 60 mm  
Housing width: 84 mm

**Color**  
Housing: RAL 9005 black

**Approvals**  
- CE label in accordance with Low Voltage Directive 2006/95/EC  
- EMC Directive 2004/108/EC  
- Innova GS  
- CSA NRTL/C (only without plug)

**Load rating**  
100-240 / 173-415 Vac  
Input: 1x32 A oder 3x32 A  
Output: 10 A / 16 A

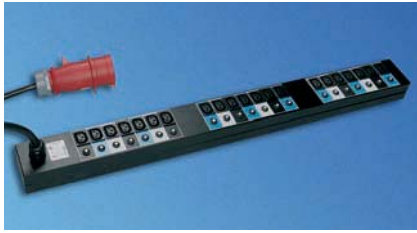
**Supply schedule**  
1 socket strip (PDU)  
2 mounting brackets  
1 19" mounting bracket (additional with 19 installation option)  
Operating instructions



DOS20155

L	S	n	F1	19"	Plug	Model	Order no.	UP
375		5	●	●	●	BladePower® PDU 1x 32 A	03.630.005.1	1 unit
740		15	●	●		BladePower® PDU 3x 32 A	03.630.015.1	1 unit
375		5	●	●		BladePower® PDU 1x 32 A	03.630.805.1	1 unit
740		15	●			BladePower® PDU 3x 32 A	03.630.815.1	1 unit

# Knürr DI-Strip® – for server applications



DOS20158



DOS20159

## Knürr DI-STRIP® PizzaPower® Technical data

- Individually fused via thermal circuit breaker that can be reset in acc. with IEC60934.
- Cable: H05VV-F 3G 4 mm<sup>2</sup>.
- Cable: 4 m.

### Material/finish

Housing: Sheet steel, zinc-passivated, powder-coated

### Dimension

Height: approx. 60 mm  
Housing width: 84 mm  
Height with cable: approx. 176 mm

### Color

Housing: RAL 9005 black

### Approvals

- CE Symbol in accordance with Low Voltage Directive, 2006/95/EC
- EMC Directive 2004/108/EC
- BV GS
- CSA NRTL/C (only without plug)

### Load rating

100-240 / 173-415 Vac  
Input: 1x32 A or 3x32 A  
Output: 10A (C13)  
Output: 16 A (C19)

### Supply schedule

- 1 socket strip (PDU)
- 2 mounting brackets
- 1 19" mounting bracket (additional with 19 installation option)
- Operating instructions

L	S	n	F1	19"	Input values	Input plug	Outputs IEC60320		Order no.	UP
							C13	C19		
400	7	●			230Vac, 32A	IEC60309 1ph/N/PE 6h	7		03.631.007.1	1 unit
400	7	●			230Vac, 32A	Open end	7		03.631.807.1	1 unit
720	16	●			230Vac, 32A	IEC60309 1ph/N/PE 6h	12	4	03.631.124.1	1 unit
960	24	●			230Vac, 32A	IEC60309 1ph/N/PE 6h	24		03.631.240.1	1 unit
1017	25	●			230Vac, 32A	IEC60309 1ph/N/PE 6h	21	4	03.631.214.1	1 unit
933	21	●			230/400Vac, 32A	IEC60309 3ph/N/PE 6h	21		03.631.021.1	1 unit
933	21	●			230/400Vac, 32A	Open end	21		03.631.821.1	1 unit
408	6	●			230/400Vac, 32A	IEC60309 3ph/N/PE 6h		6	03.631.006.1	1 unit
939	21	●			230/400Vac, 32A	IEC60309 3ph/N/PE 6h	9	12	03.631.912.1	1 unit
1362	36	●			230/400Vac, 32A	IEC60309 3ph/N/PE 6h	36		03.631.360.1	1 unit
1002	24	●			230/400Vac, 32A	IEC60309 3ph/N/PE 6h	18	6	03.631.186.1	1 unit

Dimensions in mm: L = Length, W = Width, H = Height, S = Switch,  
n = Number of sockets, F1 = Standard side, F2 = Design side, 19" = Suitable  
for 19" installation, Safe = Child-safe, U = Standard height unit, UP = Unit of  
packaging.

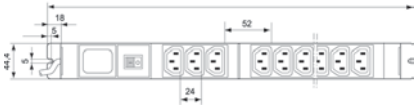
= Express item

Conversion: 1 mm = 0.03937 inch      1 kg = 2.2046 pound

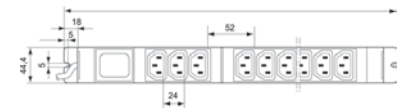
Replace .x with the number of your color combination:  
.1 = RAL 7035, .6 RAL7035/RAL 2003



DOS20062



DOS00498



DOS20042

## Knürr DI-STRIP® Euro Socket System, IEC 320 with cable and right angle plug

- Optionally with lit switch, 2-pole switching.
- 19" installation option.
- With Euro combinations of IEC 320 sockets .
- Cable: H05VV-F 3G 1.5 mm<sup>2</sup>.
- Cable: 2.5 m.
- Without fusing.

### Material/finish

Housing: Closed sheet steel extrusion, zinc-passivated, powder-coated texture  
Plastic parts: Vampamid 6 0024 VO (UL94), recyclable

### Dimensions

Height: 45.5 mm  
Housing width: 44.4 mm (= 1 U)

### Approvals/certificates

- CE label in accordance with Low Voltage Directive 2006/95/EC

- EMC Directive 2004/108/EC
- Innova-GS
- CB-scheme

### Color

Housing: RAL 7035 light gray  
Plastic parts: RAL 7021 dark gray

### Load rating

250 Vac/10 A, Sheet F  
250 Vac/16 A, Sheet J

### Approval symbols for IEC 320 3-way Euro combinations

VDE, UR, CSA

### Supply schedule

1 socket strip  
2 mounting brackets

L	S	n	F1	19"	Input values	Input plug	Output Sheet F	Sheet J	Order no.	UP
333		6	•		230Vac, 16A	Schuko CEE7	6		03.600.006.1	1 unit
383	•	9	•	•	230Vac, 16A	Schuko CEE7	9		03.602.009.1	1 unit
483		12	•	•	230Vac, 10A	ICE60320 Sheet E	12		03.600.312.1	1 unit
783		18	•		230Vac, 16A	ICE60320 Sheet I	15	3	03.600.418.1	1 unit
783		18	•		230Vac, 16A	ICE60309 1ph/N/PE 6h	15	3	03.600.518.1	1 unit

# Knürr DI-Strip® – for server applications



DOS80002

## Knürr DI-STRIP® M

- With big transparent LCD display.
- Effective value display of alternating currents per phase (1-phase or 3-phase, depending on model).
- LCD display rotation in 90° steps.
- Display can be switched bright or dark.
- Unbalanced-load warning display with 3-phase model.
- Load changes signaling.
- Automatic background light reduction.
- Cable: 4m H05VV-F 5 G 4mm (PizzaPower M).
- Cable: 2.5m H05VV-F 5 G 2.5mm (TriplePower M).
- Cable: 2.5m H05VV-F 3G 1.5mm (DI-STRIP Compact M, DI-STRIP IEC320 M).

### Material/finish

PizzaPower® model:  
Housing: Sheet steel, zinc-passivated, powder-coated  
Other models:  
Housing: Closed sheet steel extrusion, zinc-passivated, powder-coated texture  
Plastic parts: Vampamid 6 0024 VO (UL94), recyclable

### Approvals

- CE label in accordance with Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- GS

### Color

PizzaPower M model:  
Housing: RAL 9005 black  
Other models:  
Housing: RAL 7035 light gray  
Plastic parts: RAL 7021 dark gray

### Supply schedule


1 socket strip with ampere meter  
2 mounting brackets  
2 19" mounting brackets (with 19" installation option)

### Note

- Other models (e.g. Sheet J outputs) on request

L	Type	Input values	Input plug	Outputs IEC60320			Order no.	UP
				C13	C19	Schuko		
483	DI-STRIP® PizzaPower® M	230Vac, 32A	IEC60309 1ph/N/PE 6h	7			03.636.007.1	1 unit
933	DI-STRIP® PizzaPower® M	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	21			03.636.021.1	1 unit
1033	DI-STRIP® TriplePower® M	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	21			03.606.821.1	1 unit
1833	DI-STRIP® TriplePower® M	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	45			03.606.845.1	1 unit
1133	DI-STRIP® TriplePower® M	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	18	6		03.606.824.1	1 unit
1733	DI-STRIP® TriplePower® M	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	36	6		03.606.842.1	1 unit
483	DI-STRIP® Compact M	230Vac, 16A	Schuko			6	03.306.006.1	1 unit
483	DI-STRIP® IEC320 M	230/400Vac, 16A	Schuko	9			03.606.009.1	1 unit
233	DI-STRIP® Ampermeter	230/400Vac, 16A	GST18				03.606.200.1	1 unit

Dimensions in mm: L = Length, W = Width, H = Height, S = Switch,  
n = Number of sockets, F1 = Standard side, F2 = Design side, 19" = Suitable  
for 19" installation, Safe = Child-safe, U = Standard height unit, UP = Unit of  
packaging.

 = Express item

Conversion: 1 mm = 0.03937 inch      1 kg = 2.2046 pound

Replace .x with the number of your color combination:  
.1 = RAL 7035, .6 RAL 7035/RAL 2003



DOS80002

## Knürr DI-STRIP® RM

- Real RMS value display for the alternating current per phase.
- LCD display rotation in 90° steps.
- Display bright/dark switchover.
- Warning display for unbalanced load.
- Load changes signaling.
- Automatic background light dimming.

### Data interface:

- The plug strip can be integrated into the network via an RJ45 plug.
- Access is possible without special software via a remote browser.
- Three variable limit values and a warning for unbalanced loads can be specified.
- The module enables access for up to 5 users or administrators; access is password-protected.
- The software displays the name and place of the PDU; this information can be entered by an administrator.
- The user can specify a static IP address or access using DHCP.
- Firmware updates can be made via a browser.
- Supported protocols: HTTP, SNMP (Traps, SET, GET), Syslog.

### Material/finish

- PizzaPower model:  
Housing: Sheet steel, zinc-passivated, powder-coated
- Other models:  
Housing: Closed sheet steel extrusion, zinc-passivated, powder-coated texture  
Plastic parts: Vampamid 6 0024 VO (UL94), recyclable

### Dimensions

- Width: 84 mm (PizzaPower), 44.4 mm (other)
- Height: 60 mm (PizzaPower), 44.4 mm (other)

### Color

- PizzaPower model:  
Housing: RAL 9005 black  
Other models:  
Housing: RAL 7035 light gray  
Plastic parts: RAL 7021 dark gray

### Approvals

- CE label in accordance with Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- GS

### Supply schedule

- 1 socket strip (PDU) with remote ampere meter
- 1 mounting brackets
- Operating instructions

L	Type	Input values	Input plug	Outputs IEC60320			Order no.	UP
				C13	C19	Schuko		
733	DI-STRIP® Compact RM 8	230Vac, 16A	Schuko CEE 7/4			8	03.307.008.1	1 unit
1183	DI-STRIP® Compact RM 17	230Vac, 16A	Schuko CEE 7/4			17	03.307.017.1	1 unit
633	IEC320 RM9	230Vac, 16A	Schuko CEE 7/4	9			03.607.009.1	1 unit
933	IEC320 RM18	230Vac, 16A	Schuko CEE 7/4	18			03.607.018.1	1 unit
1133	DI-STRIP® TriplePower RM	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	24			03.607.825.1	1 unit
1833	DI-STRIP® TriplePower RM	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	45			03.607.845.1	1 unit
1233	DI-STRIP® TriplePower RM	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	18	6		03.607.824.1	1 unit
1833	DI-STRIP® TriplePower RM	230/400Vac, 16A	IEC60309 3ph/N/PE 6h	36	6		03.607.842.1	1 unit
1111	DI-STRIP® PizzaPower® RM	230Vac, 32A	IEC60309 1ph/N/PE 6h	24			03.637.023.1	1 unit
871	DI-STRIP® PizzaPower® RM	230Vac, 32A	IEC60309 1ph/N/PE 6h	12	4		03.637.016.1	1 unit
1168	DI-STRIP® PizzaPower® RM	230Vac, 32A	IEC60309 1ph/N/PE 6h	21	4		03.637.025.1	1 unit
563	DI-STRIP® PizzaPower® RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h		6		03.637.006.1	1 unit
995	DI-STRIP® PizzaPower® RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	6	12		03.637.018.1	1 unit
1022	DI-STRIP® PizzaPower® RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	21			03.637.021.1	1 unit
1157	DI-STRIP® PizzaPower® RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	18	6		03.637.024.1	1 unit
1751	DI-STRIP® PizzaPower® RM	230/400Vac, 32A	IEC60309 3ph/N/PE 6h	36	6		03.637.042.1	1 unit

# Inline Metering System (IMS) – Optimum upgrade solution for existing installations

Monitoring is already part of the every-day routine in most data centers when it comes to system availability. For this reason you decide with new systems for socket strips/PDUs with integrated monitoring (Managed PDUs or Adaptive PDUs). But what do you do with existing systems in which socket strips/PDUs are usually installed without measuring functions?

**Emerson Network Power's solution for this is called IMS** (Inline Metering System). These modules allow existing racks with installed basic power distributors to be upgraded accordingly. As almost all server racks are supplied with an A and a B-feed, **later installation is possible without interruption**. The IMS modules can also be installed space-savingly inside or outside the rack, e.g. in false floor. The Inline Metering Systems (IMS) are divided into **three different product groups, with different features**.

## Emerson Network Power Inline Metering Systems (IMS) benefits:

- Existing rack PDUs do not have to be swapped out, as the modules can be upgraded.
- All consumers (where possible) can be integrated into the monitoring system, as numerous plug systems are provided (1ph – 3ph, max 63A per phase).
- Flexible installation inside or outside the rack (e.g. in the false floor).

## Inline Metering System (IMS)

### IMS model series overview:

#### Knürr DI-STRIP IMS

#### Features:

- Fast installation and easy data recording with graphic and numerical power consumption overview; can be retrieved via web interface.
- The power value can be read directly on the rack, as a local display is installed in every module.
- An N-conductor overload with 3-phase systems can be prevented, as the phase symmetry is monitored.
- Alarm signal when incidents occur, as the threshold values (phase symmetry, bottom limit, pre-warning and alarm) can be set flexibly.



#### Liebert MPX IMS

#### Features:

- Liebert Rack PDUs familiar software interface, as the same communication card as with Liebert MPX™/MPH™ is used.
- Highest possible security and availability with an operating temperature of max. 55°C.
- Extensive measurement functions (power, current, voltage and energy), with high measurement accuracy of up to ± -1%.
- An N-conductor overload with 3-phase systems can be prevented, as the N-conductor current is monitored.
- Easy connection of up to 4 Liebert MPX IMS / MPH™ / MPX™ on the network with only 1 IP address.
- External sensors and a display can also be connected.



#### Knürr MODULAR IMS

#### Features:

- Extensive measurement functions (power, current, voltage, energy and power factor), with higher measurement accuracy of up to 0.17% referring to the end value.
- Very high input currents can be measured (up to 999A per phase via external transducer).
- The modular setup means the solution can be adjusted customer-specific (e.g. up to 4 in-feeds per module with different input plugs or even fixed in-feed are possible).
- Up to 75 modules can be controlled via one IP address.
- Saving in external databases possible without additional software.





#### INPUT POWER

- Single-phase or three-phase
- 16A up to 63A



#### OUTPUT DISTRIBUTOR

- Single-phase or three-phase
- 16A up to 63A



#### MODULARITY

- Depending on the type of communication card, external displays or external sensors



#### MONITORING

- Input level



#### LOCAL MONITORING

- Display for user (MPX IMS and DI-STRIP IMS)



#### REMOTE MONITORING

- Secure web and SNMP interface



#### RACK PDU ARRAY™

- One IP address, up to 4 rack PDUs (MPX IMS)
- Liebert MPX™, Liebert MPH™ and Liebert IMS in the same private network



Existing power distribution upgrade: Inline Metering System from Emerson Network Power.

# Emerson Network Power IMS product series

Features	Knürr DI-STRIP® IMS	Liebert MPX™ IMS	Knürr Modular IMS
Measurement module	x	x	x
Modular			x
Display	Fixed	External	
Remote interface	x	x	x
Measuring at input level	x	x	x
Measurement modules per IP address	1	4	75
Max. measurement points per IP address	1	4	300
Visualization at PDU level	x	x	x
Visualization at rack level		x	x
Visualization at room level	Only with additional software Liebert Nform	Only with additional software Liebert Nform	x
Measurement parameters	A	A,V,W,kWh	A,V,W,VA,Var, kWh, cosphi.
Phase asymmetry analysis	x	x	x
Connection option external sensors		x	x
Input power	1ph + 3ph max 32A	1ph + 3ph max 32A	1ph + 3ph, max 63A (max 4 feeds), max. 3ph 999A (via external transducer)
Connection option	IEC 60309, IEC60320, Schuko	IEC 60309	IEC 60309, GST18, fixed connection
Protocols	HTTP, SNMP, Syslog	HTTP, HTTPS, SNMP, Telnet	HTTP, HTTPS, SNMP v3,
Saving in external database	With additional software Liebert Nform	With additional Liebert Nform or Avocent DSView software	Oracle, MySQL, MSSQL

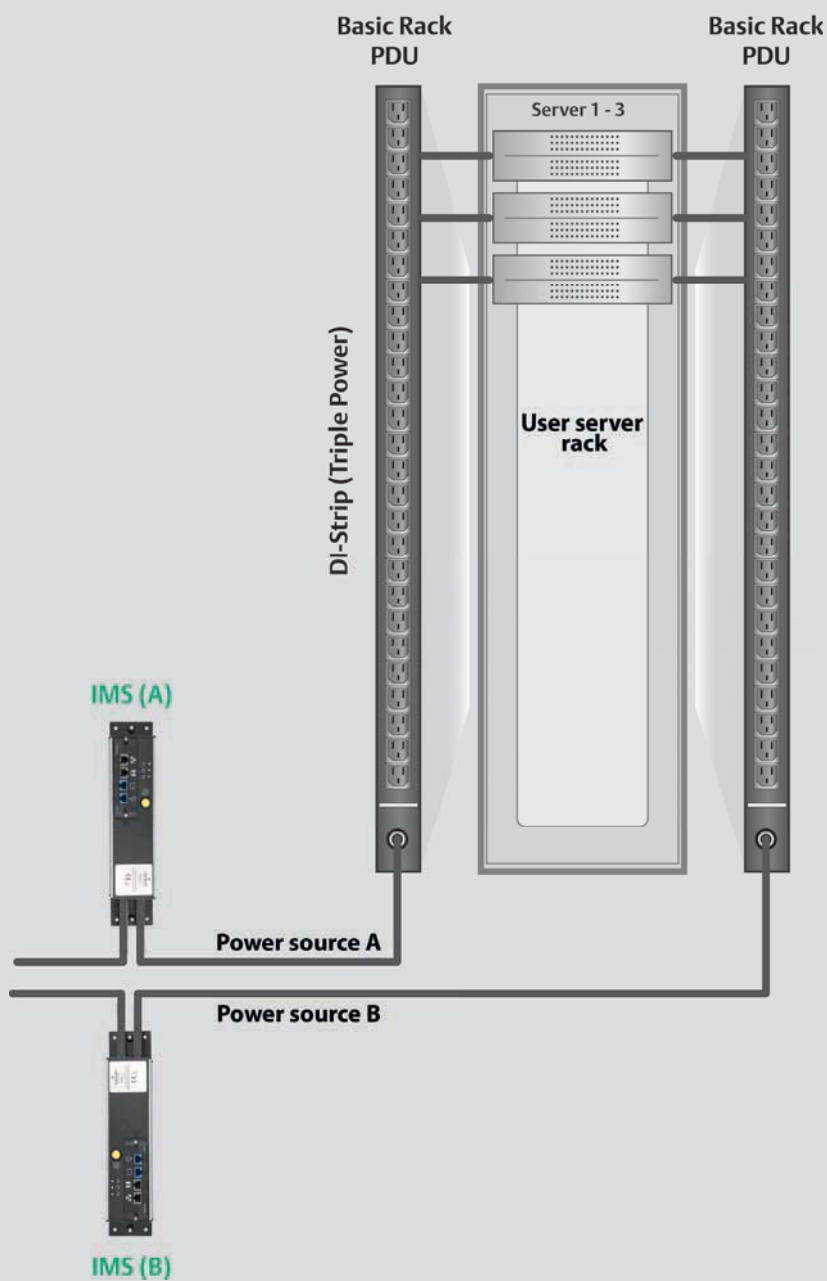
## Order numbers:

Order number 1 ph. 16 A	036072001	MPXIMS-EHBAXS30	030145118
Order number 1 ph. 32 A	036072011	MPXIMS-EHBAXQ30	030145128
Order number 3 ph. 16 A	036072021	MPXIMS-EHBAXT30	030145138
Order number 3 ph. 32 A	036072031	MPXIMS-EHBAXR30	030145148
Control unit	Not required	Not required	030145108





Easy upgrade from basic power distributor to measurement-enabled power distributor



# Knürr PowerTrans® Power Distribution Rack

## Knürr PowerTrans®

... forms the interface between the low voltage feed and the PDUs of the DI-STRIP® product family and other components for supplying servers and other IT equipment. The rack's basis: to connect Knürr Mirace!® with the existing PowerTrans® 19" slot-in units the elements are simply slotted in and fixed at a free spot. The electrical connection to the rack is set up immediately. The power distribution is performed in the individual slot-in units and therefore no longer has to be installed fixed in the building.

Up to 8 slot-ins can be integrated. Each slot-in is supplied with an A and B feed (redundancy). With max. 250 A per phase one single rack can provide loads of up to 346 kVA. Plug & Play: only the main feed on the rack must be installed by an electrician.

The individual slot-in units and the PDUs can be connected per Plug & Play installation, making later extensions cost-effective. Slot-in units with measurement function are also available. This slot-in unit allows you to measure and moni-

tor the electrical measured variables at the early main distributor stage. This slot-in unit will replace standard analog volt and ampere meters and measuring devices for power outputs and power factor.

The required measured variables can be "customized" in six display panels. The system can also be connected to an LAN. The measured values are then displayed and saved on a PC in the LAN or on the Internet.

- Clear and transparent displays.
- Customized setting of measured variables for standard displays.
- Wide range of application with flexible adjustment of input variables.
- Connection error detection with installation.
- Communication with LAN enables integration into energy management.
- Easy reading and display of measured data with MS Excel allows the user to flexibly configure their own solutions.



### Equipping and installation

The outputs of the slot-in units can be flexibly equipped as the customer wishes with the most diverse features: different CEE and GST18 type plug connections (e. g. Adaptive, Managed and Basic PDUs and flexible power distribution with the GST18i5 distributor block, 3-phase).



### Measurement slot-in unit with extensive measurement functions (local or remote)

Can be integrated into various management programs.



#### INPUT POWER

- Max. 250 A per phase
- 1 ph. or 3 ph. Feed
- Max. 2 feeds per rack



#### OUTPUT DISTRIBUTOR

- 230/400V - 32A via IEC 60309 socket
- 230/400V - 16A via GST 18 socket
- 230V - 32A via IEC 60309 socket



#### MODULARITY

- Output distributors can be modularly equipped during running operation.



#### MONITORING

- Power Trans Rack complete and each individual slot-in and output.



#### LOCAL MONITORING

- Display for user
- Display at rack level and at slot-in level/output level



#### REMOTE MONITORING

- Secure web and SNMP interface



#### OVERLOAD PROTECTION

- Circuit breakers for every output



Knürr PowerTrans® for professional power distribution in the data center.

# References:

## Secure, stable and highest possible measurement accuracy

Several renowned companies quickly opted for the Liebert MPX™ modular power supply. We not only consider the individual servers that the PDUs are connected to – together with the customer we also keep a keen eye on the complete solution.

Every customer has different challenges and requires a solution harmonized with their needs. The following examples show how different the customer's individual requirements are and how these have been met with our solutions.

### Automotive manufacturer

**"A standardized system on which different solutions can be set up is important for us. As the same busbar is always used, we don't have to think about possible requirements in the preliminary stage.**

We have racks with which it is only the overall consumption we are interested in. On the other hand there are servers with which we also have to note the exact consumption. The ability to select the different modules allows us to equip the busbars as required.

Existing racks in the data center will also be integrated into the management system. With the "IMS Liebert MPX" Inline Metering System we can easily integrate these racks into the existing management platform, as the same communication card as with the MPH/MPX is installed in this product. This

allows all features to be used together (e.g. external sensors, rack PDU array, external display)."

### Stock exchange trading

**"The power values of each individual server have to be measured – and with the highest possible accuracy. This is why we equip the busbars with the "Receptacle Managed" output modules, which have an individual port measurement with an industry-wide highest measurement accuracy of +/-1%.**

The data interface to the outside must communicate with an "open" protocol, so that the PDU can be integrated into the existing management software.

Ready to use plug-ins also allow the PDU to be integrated into open management platforms, such as Nagios, for example."



*Modular power supply in data centers  
in stock exchange trading ensures reliability.*

# References:

## Space-saving and standardized system

### University data center manager

**"We operate a cluster computer here, and we provide its computing performance to various third level education institutes. For us the most important thing is to get as much computing power as possible for as little money as possible, and nevertheless ensure a secure operation."**

As we have to distribute the computer's operational costs among the individual institutes, we use socket strips with measurement modules that we can retrieve via the network.

Recently there have been more and more failures here due to the high temperatures at the back of the racks. For a couple of months now we have been using the MPH from Liebert, which is significantly more temperature-stable than other products on the market – and now there are no problems. Plus the price is right and the measurement accuracy is first class."

### DC infrastructure manager of a large housing/collocation provider

**"When we set up the infrastructure in a DC module we don't know yet what equipment our customers are going to bring into the equation."**

This isn't a problem for the server racks; the installation dimensions are standardized – we can use standard racks any time and are therefore ready for everything.

It's not the same with power distributor strips however; there are too many different connector plugs. Until now we were always obliged to swap out complete distributor strips whenever a customer brought in new equipment.

This always entailed very high costs because the entire power cabling had to be laid again right up to the busbars.

We have now decided for Liebert MPX so that we can adjust the power distribution in the rack to the respective requirements by simply changing the output modules.

We were also really impressed here by the fact that the busbars and housings are made of very robust aluminum and easily survive numerous swap-outs undamaged.

Another important aspect for us is the exceptional accuracy of the power measurement, as we invoice the power costs individually to our customers."

### State IT center (modular IMS)

**"Electrical data has to be recorded in the data centers with up to 4 feeds. The data has to be collected and analyzed centrally in databases. Existing comprehensive management platforms must also be able to access the data."**

Alarms have to be signaled to the existing alarm management.

400 racks are currently distributed over 3 sites. Current, voltage, power and temperature per rack have to be recorded. The feed is flexible, from 16A 1ph to 63A 3ph.

An open protocol (SNMP) and floating contacts must be provided to the outside so that the data and alarms can be processed. We are constantly growing, so the installation has to be set up extremely flexible and modular.

The Knürr IMS modular system is the best solution for our applications, as our business is very dynamic. Modularity and flexibility are therefore very important for us."



*SmartAisle™ from Emerson Network Power – Cold aisle containment at the highest possible technical level in the modern data center.*

# System solutions

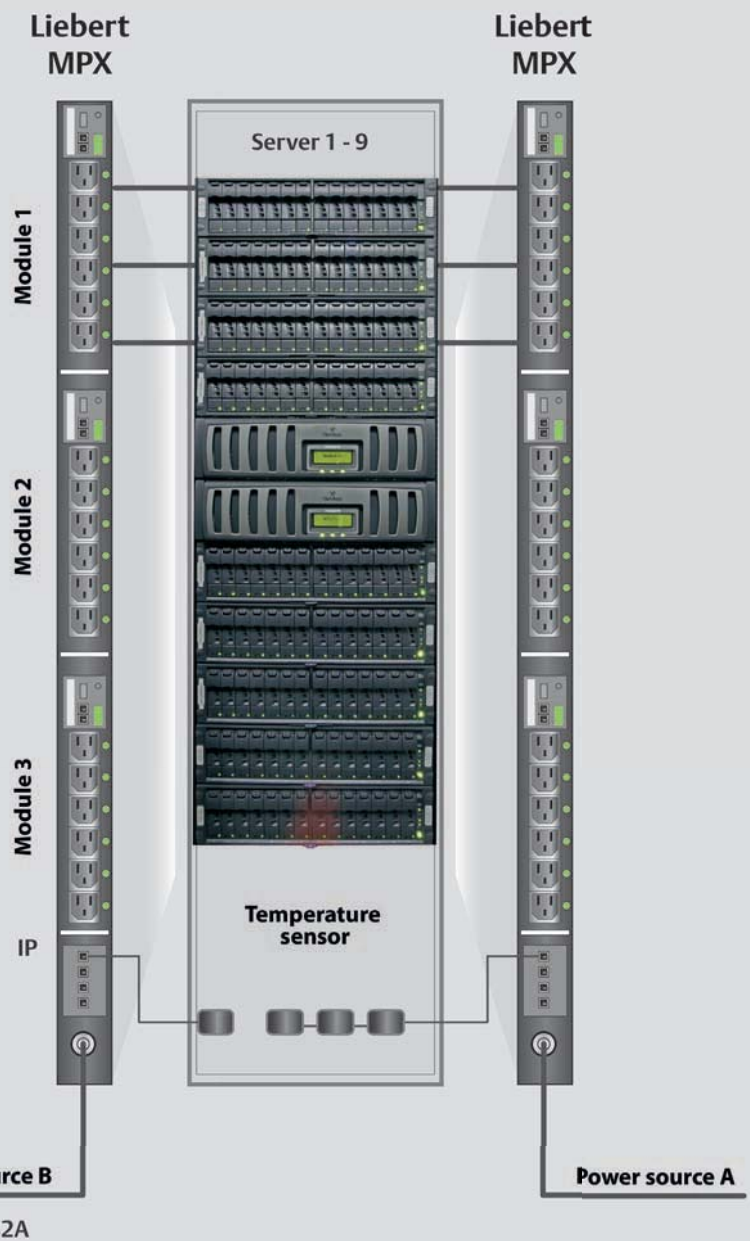
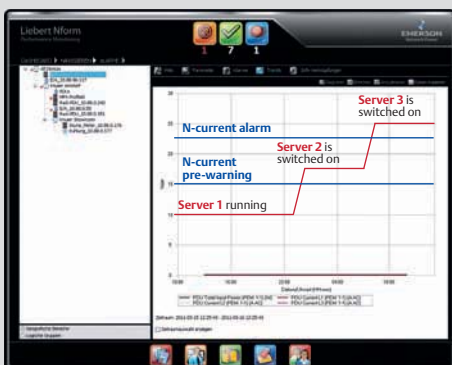
## 1. MONITOR – Early failure detection for more security

Identify faults early on with comprehensive and early-detection monitoring of numerous measured values (N-conductor current, crest factor, power factor, apparent power)

### N-conductor current monitoring example:

The supply in the rack is 3-phase. With unbalanced load the N-conductor is stressed. An unbalanced load occurs when at least one phase is loaded more than the others. If an unbalanced load is too high the connection cable can heat up, as the N-conductor is not configured higher than the other wires in the cable. To prevent this the standard software of the Liebert MPX™ has two threshold values for the current in the N-conductor.

When server 2 is switched on the "N-current pre-warning" limit value is exceeded; a signal is sent. When the third server is switched on the "N-current alarm" limit value is exceeded; a signal is sent. All signals are shown on the web interface and also forwarded to the management software.







*Backing up business-critical IT applications based on technology and experience: Emerson Network Power.*

# System solutions

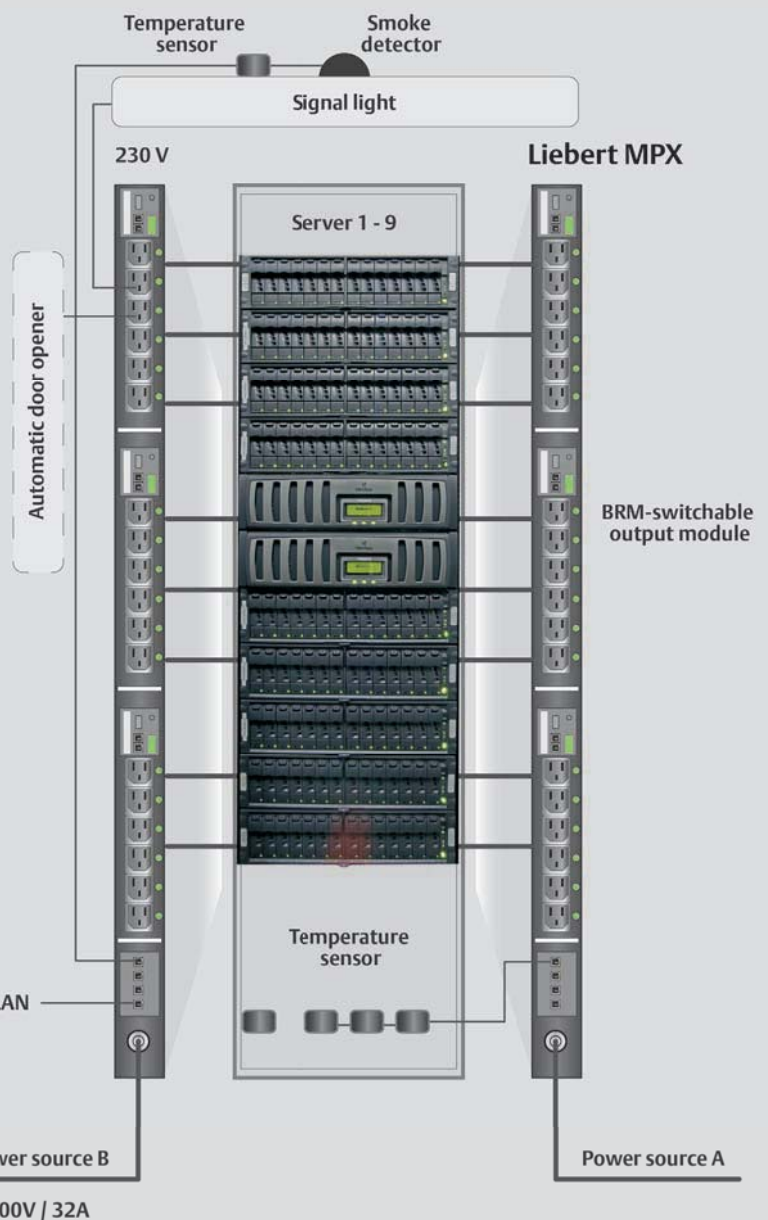
## 2. CONTROL – Execute control commands at low cost

### Execute control commands when specific incidents occur

Different sensors can be connected to the Liebert MPX™. The incidents occurring (e.g. excess temperature, alarm signals from external components, etc.) can be displayed in the software, and also forwarded to the respective management software. Specific control commands can also be executed.

**Example:** A temperature sensor and a floating input contact can be connected to the Liebert MPX™. With excess temperature a signal is sent so that the thermal management system increases the power. The Liebert Nform management software also forwards a switching command to the Liebert MPX™ to switch on the signal lights.

A floating input contact is connected to a smoke detector. If this goes off the doors are opened automatically and an alarm is forwarded to the management software.



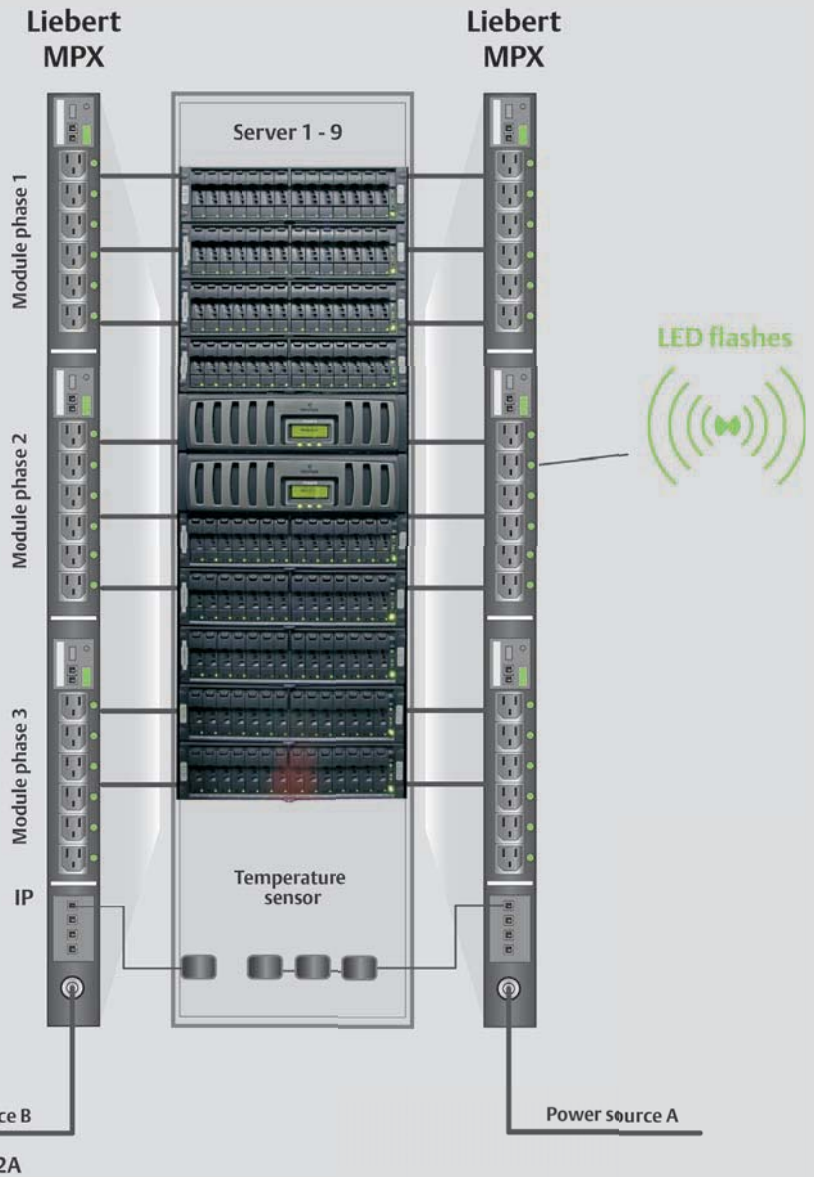


### 3. SECURE – Guarantee security with a better overview

#### Guarantee security

With a fully fitted rack (36 servers are fixed per side on the Liebert MPX™) a technician must remove a server and disconnect the mains cable.

**Solution:** Each individual server is labeled with a name in the Liebert MPX™ software. With a click on the button in the software the respective LED beside the server's mains cable flashes. The technician sees immediately which mains cable they can disconnect.



# Masterguard Trinergy® from 200 to 1200 kW

**A revolutionary high performance UPS with dynamic operating modes, scalability up to 9.6 MW and 99% efficiency. Trinergy provides optimum performance and reliability with drastically reduced total operating costs (TCO).**

## Highest UPS level of efficiency, up to 99%

- Interface for power feed on the bypass.
- Real-time input power tracking.
- Intelligent algorithm for mode change.

## 3-dimensional modularity

Thanks to Trinergy's three-dimensional modularity, companies can always extend their UPS infrastructure whenever changing load requirements demand it. Further power modules are simply added!

Up to 9.6 MW effective power can consequently be reached – an unprecedented power level.

## A first in the industry

Masterguard Trinergy®, the revolutionary UPS architecture is based on the fact that three standard operating configurations are combined for the first time in one single high power UPS:

- **Maximum power control (VFI)**
- **Maximum energy savings (VFD)**
- **High efficiency level and optimum power conditioning (VI)**

The unique Masterguard Trinergy® technology mix enables the system to monitor the environment and the network's operating conditions, and to independently select the operating mode that is best suited for the power conditions.

Masterguard Trinergy® can determine the most efficient operating mode for the respective network conditions and ensures the consumer supply is optimum at all times.

The system consequently achieves exceptional energy savings, a first class power level and maximum security with power supply.<sup>1</sup>

The Masterguard Trinergy®'s high level of flexibility, energy efficiency and adaptability are in harmony with the "Best Practice Strategies" in data centers and another confirmation of its outstanding efficiency.

## Features

- Transformer-free system setup.
- Comprehensive IGBT double converter technology.
- Excellent input power
  - PF > 0.99
  - THDi < 3%
- Output PF up to 1.
- Diagram of the output power factor symmetrically referring to zero point.
- Permanent 100 % kVA – no power reduction, regardless of the load (capacitive or inductive).
- Optimum ratio between space requirement and power.
- Automatic output power increase by up to +10 %.
- High conversion efficiency (certified up to 99%).

<sup>1</sup>) Class 1 IEC 62040-3) CBEMA



*Masterguard Trinergy® –  
Unique architecture and technology.*

# Emerson Network Power core competencies

When you work together with **Emerson Network Power** to meet your company-wide requirements in the **Business-Critical Continuity™** area, you not only benefit from our products for **supporting and protecting your technology infrastructure**. By developing a wide range of technologies, we have detailed industry knowledge and can estimate the requirements for the interaction of systems in critical environments in the overall context.

We provide this know-how with the aid of Emerson Network Power's core competencies. This entails different areas **of first class products and services**, which will help you to select the right solution for your requirements, location and area of application, so that you can provide your customer the best services at all times.

## ■ AC power

Business-critical processes – available at all times. With an expansive range of UP systems from Liebert® and Chloride and the respective power distribution components and racks – from individual products through to integrated systems – we ensure an uninterrupted operation of network racks, computer rooms and data centers.

## ■ Infrastructure management and monitoring

Management and monitoring of critical environments around the clock at several locations. We have the right solutions for ROI-oriented business environments: professional infrastructure management and 24/7 monitoring systems, services for constant controlling in data centers, computer rooms and network racks, as well as wireless, wireline and enterprise communication applications.

## ■ Power switching and regulation

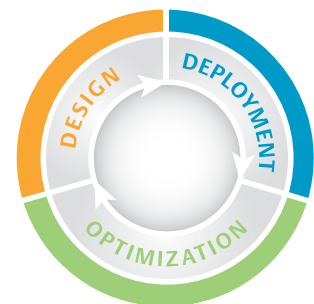
Protection in systems against operational failure caused by power supply interruptions. We provide ASCO® Power Transfer Switches, network-parallel control cabinets for equipment/power regulation systems, touchscreen-SCADA for monitoring and controlling power supply and on-site power equipment as a backup to guarantee an uninterruptible power supply for important and business-critical communication and data processing systems, vital security systems and other critical loads. We commission industry leaders here, work with directly location-related project management and deploy the best service technicians in the industry.



## Infrastructure services and support

Emerson Network Power's core competencies are supported by the industry's biggest global service organization. Your services:

- Design, installation and startup
- Warranty service
- Preventative maintenance
- Remote monitoring around the clock
- Emergency service
- Site checks



### Design

Advance planning is critical for a successful operation. We therefore offer flexible services in development and installation for a smooth startup and life-long effective and efficient operation.

### Installation

Right now today, we already integrate the flexibility and scalability for your growth tomorrow.

### Efficiency

Optimization means using your infrastructure efficiently. Emerson Network Power offers you optimized support for your daily requirements and long-term plans – for energy savings in particular.

### Chloride LIFE.net

- Maximized system availability – real-time diagnostics and removal of every kind of operating fault.
- Minimized downtime – qualified service technicians available around the clock.
- Reduced operational costs – thanks to preventive maintenance.

### Precision cooling

Guaranteed precise temperatures for reliable equipment performance. We provide "Chip-to-Room Cooling" – the most extensive range of precision cooling systems from Liebert, which allows even the smallest temperature changes to be ruled out so that your business-critical applications can be reliably protected.

### Racks and integrated racks

Optimization of the technology and performance requirements for indoor IT applications. We provide standardized and customized integrated rack solutions that meet all individual requirements. Our product spectrum ranges from rack solutions from Knürr and Liebert for computer rooms of every size through to integrated enclosures with their own thermal management, UPS and cable management in a robust, lockable rack.

### Surge protection

Power supply, voice content and data protection in the network against system fluctuations and dangerous electrical faults. Depending on the application we provide Liebert and PowerSure™ AC Power Protection, Islatrol™ Active Tracking Filters or Edco™ data/signal surge protection equipment for securing the power supply, minimizing downtimes, saving valuable work time and extending equipment and device service life.

### Services

Provision of reliable analysis and test programs – supported by the biggest global service organization in the industry. Our offering includes engineering, installation, start-up services, project management, training and extensive on-site operational management, preventative and prognostic maintenance and energy consumption monitoring.

# Emerson Network Power

## Data center infrastructure

### Precision cooling

#### SmartAisle™

- Aisle containment.
- Highest energy efficiency.
- Compatible with all Liebert cooling units.



#### Liebert HPM

From 4 kW to 230 kW, DX-Digital Scroll-CW.

- First class energy efficiency.
- Certified performance (Eurovent).
- User-friendly iCOM controls.



#### Liebert HPC

Extensive range of highly efficient chillers with free cooling of 40 kW to 1600 kW.

- Specially designed for data center applications in combination with SmartAisle™.
- First class energy efficiency.
- iCOM control.



#### Liebert CRV

- Highly-efficient linked precision cooling units, available in the DX or CW version.
- Decoupled control for airflow and cooling capacity.
- Cooling capacity modulation with Digital Scroll.
- iCOM control with remote rack sensors.



#### Liebert XD

- Cooling agent-based high-density cooling applications close to servers.
- "Hot spot" management for up to 30 kW per rack.
- On-demand upgrade as with "Plug&Play"
- High efficiency and 100% sensitive cooling.

### AC Power

#### Chloride Trinergy

- Dynamic function modes (VFI, VI, VFD) with an average efficiency level of 97.9%.
- Three-level module design for optimum scalability (up to 9.6 MW).
- Maximum availability thanks to internal redundancy and simultaneous maintenance.



#### Liebert NXL

- UPS for critical high power applications.
- Higher capacity and reliability
- Meets the power and energy efficiency requirements of high availability data centers.



#### Liebert STS

- Solid state digital bus transfer switch for uninterrupted power supply.
- Dual bus power supply systems for connecting critical loads with two independent UPS systems.
- High reliability with Triple-Logic redundancy with power control.



#### Power Distribution Rack

Central connection unit to power supplies for individual server racks.

- Interface between the low voltage feed and the PDU (Power Distribution Unit).
- Individually pluggable slot-in units.
- Up to 329 kVA/rack.

#### Rack PDU

Rack-based power distribution units.

- Supports measurement at socket strip level, switching at socket level and measurement and switching at socket level for remote power management/power control.
- Horizontal and vertical models for different rack configurations in branch and external offices.

### Racks and integrated racks



#### Knürr CoolTherm® 4–35 KW

- Energy-efficient server rack technology.
- Significant reduction in TCO (Total Cost of Ownership).
- Autonomous server rack; independent of environmental conditions.
- Up to 30% improved cooling system energy efficiency.



#### Knürr DCD®

- Passive cooling water heat exchanger.
- Cools up to 30 kW.
- Neutralizes room heat.
- Combinable with Knürr and other manufacturer products.



#### Knürr DCM®

- 19" rack platform for server, telecommunications and network technology.
- Aluminum construction
- Threaded connection system
- T-slot system

### Surge protection

#### Liebert TVSS

- Easy to connect to the UPS, the distributor or the service entrance of the systems.
- Surge protective devices (SPD) for protecting sensitive equipment against damage caused by short voltage rises.

### Infrastructure management and monitoring



#### Avocent MergePoint® Unity Appliance

- Secure remote access to servers (KVM over IP).
- Secure remote access to servers in data centers and branch offices.
- More error-tolerant and comprehensive remote management solution with simultaneous use of in-band and out-of-band tools.



#### Avocent MergePoint® Service Processor Manager

- Secure ESP remote management (Embedded Service Processor).
- One console for different service processor types and IPMI.
- SoL, power control and hardware monitoring support.



#### Avocent ACS Console Server

- Secure remote access (Serial over IP) to console equipment.
- Remote access to servers, routers and other console-based equipment.
- Physical use or encapsulation in one virtual machine.



#### Alber Battery Monitoring

- Monitors batteries and prevents premature battery failures.
- Internal direct current resistance test method to rule out doubts.
- Specification of the actual battery status by the user – comparable with ultrasound.



#### Knürr Synergy®

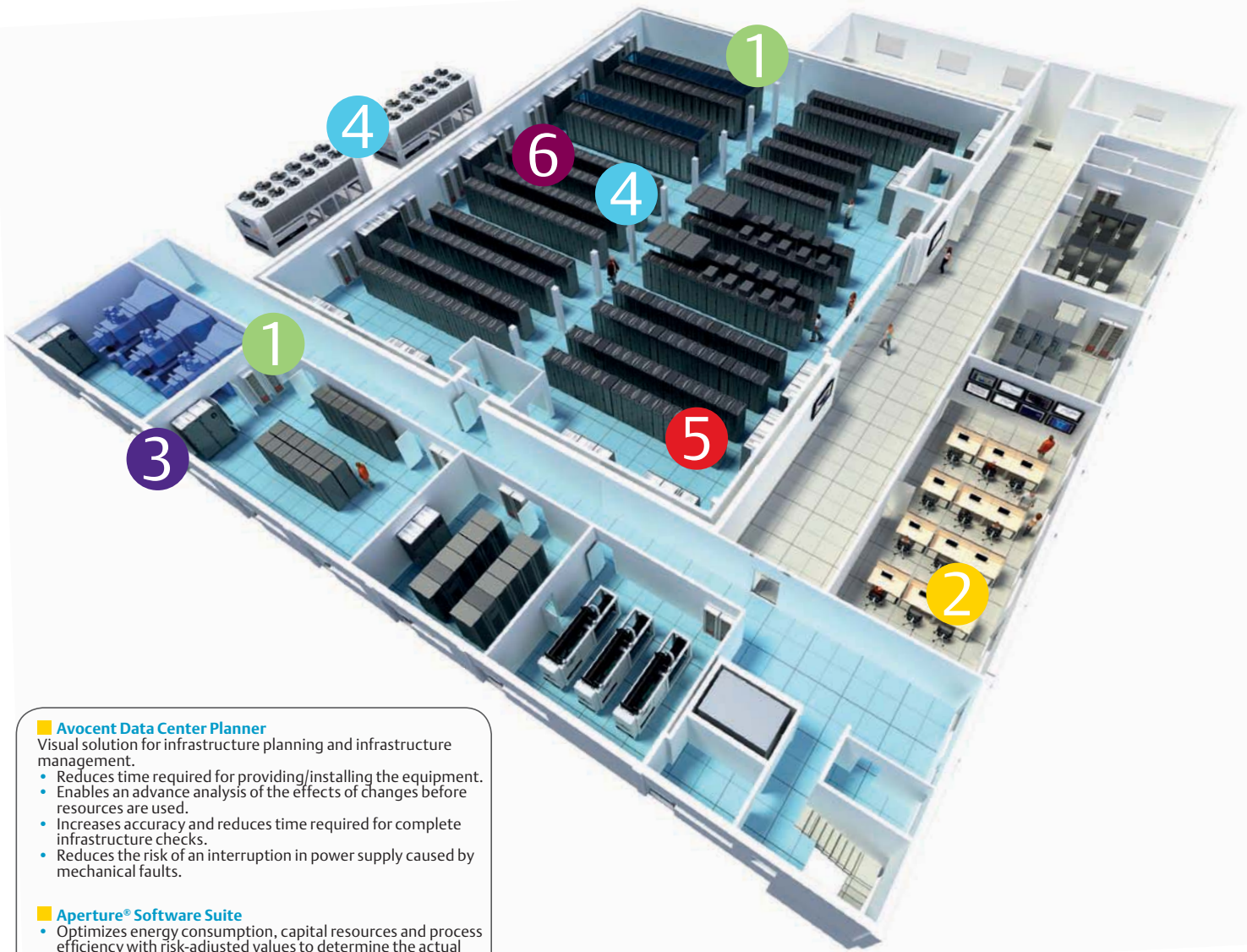
- Consoles, monitor walls and mobile equipment trolleys for control rooms.
- Standards compliance and ergonomics.
- Manually height-adjustable, even in basic version.
- Modular construction.



#### Avocent DSView® 3 Management Software

- Centralized data center management.
- Remote access, remote monitoring and remote controlling on various platforms and at different locations (time and location-independent).
- Secure, centralized out-of-band management of all connected IT and network devices in distributed data centers.





**Avocent Data Center Planner**

Visual solution for infrastructure planning and infrastructure management.

- Reduces time required for providing/installing the equipment.
- Enables an advance analysis of the effects of changes before resources are used.
- Increases accuracy and reduces time required for complete infrastructure checks.
- Reduces the risk of an interruption in power supply caused by mechanical faults.

**Aperture® Software Suite**

- Optimizes energy consumption, capital resources and process efficiency with risk-adjusted values to determine the actual resource load.
- Correct measurement of the physical infrastructure and extended service life of the data center with holistic view of the infrastructure.
- Provides a central, secure information source for the entire data center in a business service view.



**Avocent DSView® 3 Power Manager**

Detailed performance and environmental data and effortless control.

- Provides a power monitoring function in addition to DSView 3 software access and control functions.
- Monitors and measures IT energy consumption and defines the cost/development trends of internal and remote data centers.

1 AC Power

4 Precision Cooling

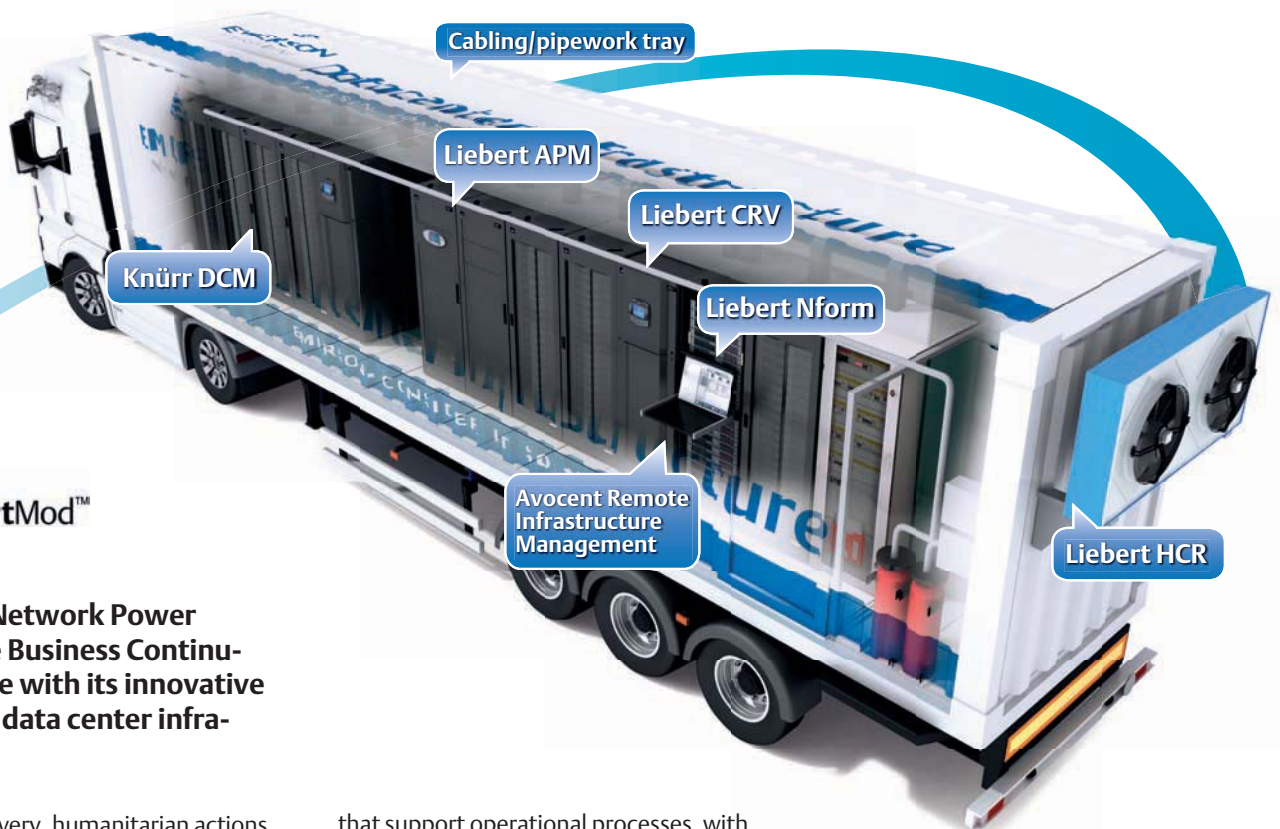
2 Infrastructure Management & Monitoring

5 Racks & Integrated Cabinets

3 Power Switching & Controls

6 Surge Protection

# Emerson Network Power Container data center infrastructure



## Emerson Network Power makes the Business Continuity™ mobile with its innovative Container data center infrastructure:

Disaster recovery, humanitarian actions with natural disasters, sports events, film productions or simple data center extensions – all at no construction cost: the Emerson Network Power mobile infrastructure meets all Business-Critical Continuity™ requirements.

Emerson Network Power once again proves that maximum efficiency is possible with this effective "All-in-one" solution for all standard and special situations!

The Container data center infrastructure is mobile and provides complete, efficient protection for IT infrastructures

that support operational processes, with both standard and special requirements.

The Container can be configured for specific customer requirements and transported anywhere to support the efficiency of stationary or temporary operations rooms.

The benefits of data centers designed for fast site relocation are: IT environment protection without impairing computing performance, continuous power management during an emergency situation and provision of a ready-to-operate integrated platform, which can be quickly activated.

The internal infrastructure includes all available innovative solutions: racks from Knürr, UPS units from Liebert and power distribution units and precision cooling units from Emerson Network Power. The layout is supplemented by infrastructure management solutions and monitoring software from Avocent.

For a virtual view of the Container solution go to:

[www.datacenterinfrastructure.eu](http://www.datacenterinfrastructure.eu)



## Emerson Network Power

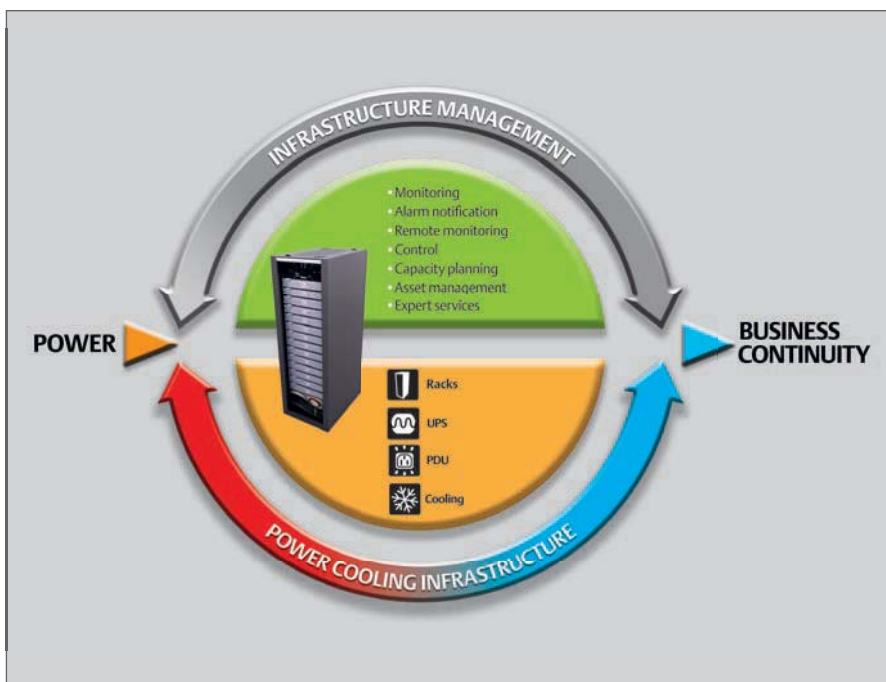
*Innovative technologies that provide our customers clear competitive benefits*

IT managers in data centers and companies are faced with constantly growing challenges: increasingly denser IT infrastructures, heterogeneous manufacturer and component landscapes for critical equipment (power supply, cooling, cabling, racks) and rising energy efficiency requirements.

**Emerson Network Power provides**

**integrated and ready-made IT solutions for small and medium-sized enterprises.**

Our racks, UPSs, cooling systems, power distribution systems and cable management solutions are supported by reliable monitoring systems and therefore form the ideal solution for setting up future-proof data centers.



Nowadays successful companies depend on adjustable technologies so they can react quickly to new market requirements. Your data center's support infrastructure must be able to support new IT developments such as virtualization and consolidation, and their power supply and cooling requirements. All changes, relocations or extensions of your IT have an effect on the entire support infrastructure. You therefore require products and support that guarantee reliable operation of your IT systems in these environments.

*You will find more information online at:*  
[www.emersonnetworkpower-emea.com](http://www.emersonnetworkpower-emea.com)

Emerson Network Power, a division of Emerson (NySE:EMR), is the world's leading provider of Business-Critical Continuity™ "Grid-to-Chip" solutions for telecommunication networks, data centers, medical facilities and industrial systems.

Emerson Network Power provides innovative solutions and expertise in areas such as AC and DC power supply, precision cooling systems, embedded computer and power supply systems, integrated racks and enclosures, network circuits and controls, monitoring and connectivity. All solutions are supported locally all over the world by Emerson Network Power customer service technicians. You will find more information on Emerson Network Power's products and support services at

[www.EmersonNetworkPower.com](http://www.EmersonNetworkPower.com)

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## Emerson Network Power™

*The Global leader in Business-Critical Continuity™ solutions.*

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

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