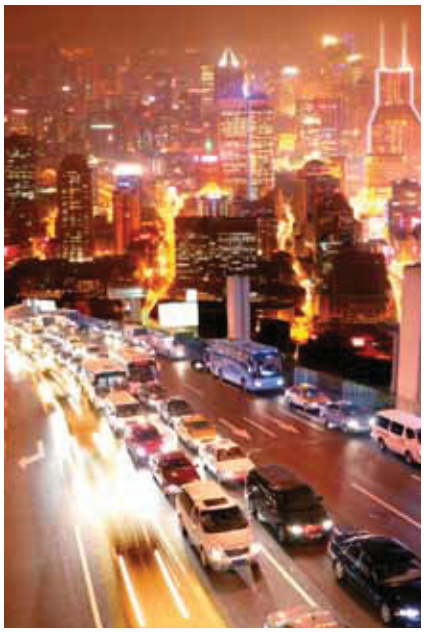
AC Power for
Business-Critical Continuity™

Liebert® APM

The Compact Row-Based UPS With FlexPower Technology™

EMERSON
Network Power

Emerson Network Power, a division of Emerson, is a global company that combines technology with design to supply innovative solutions for the benefit of its customers.
Emerson Network Power is the leader in the "***business-critical continuity***" field, thanks to the company's products and services.
Emerson Network Power's broad technology base and global expertise support a full spectrum of enterprise-wide solutions for today's vital business needs.



Regardless of your size, you can't afford for your critical business systems to go down and you can't waste time recovering your IT infrastructure after a disruption.

Leave that to us, the experts in *business-critical continuity*: from grid to chip, from the biggest to the smallest data centers, we are ready to serve your needs with the solutions we have developed.

More standardization, so you don't need further budget allocations to install it.
More simplification so you don't need to be a specialist to get the best for your business.
More support, so while you are enjoying doing business, we are protecting you.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The Adaptive Power Manager For Your Changeable IT Infrastructure.

Anticipating Technology Changes Through Adaptive Architecture.
Today, you need a power infrastructure that can work across your enterprise and respond to constant change. An infrastructure that allows you to deploy blade servers and other high-density equipment safely and cost-effectively. An infrastructure that can meet the strict power quality requirements of VoIP switches. An infrastructure that allows you to add capacity without compromising availability or serviceability.

Scalability alone can't get you there. You need an infrastructure that takes it one step further. An infrastructure that can adapt to your needs.

The Liebert® APM is the compact UPS system designed to operate with the maximum energy efficiency in the minimum footprint for the protection of the small & medium computer rooms.

It features FlexPower Technology™, which incorporates distributed intelligence and scalable power in a common assembly.

It is suitable for small & medium businesses with the attitude to grow fast: thanks to its architecture it enables to start with a basic configuration of 30kW which can grow with the business up to 4x150kW.

Lowest Cost Of Ownership

Liebert® APM is designed to minimize capital equipment expense, to protect your technologic investment and to optimize operational efficiency.

Enhanced Operational Flexibility

In response to the demand for new technologies, adaptable to customers' and market's changing needs, Emerson Network Power has developed a scalable platform that allows you to configure your own AC Power system with basic building blocks and that is able to grow according to your future requirements.

"All The Power You Need, Just The Power You Need"

With Liebert® APM you can deploy the number of power modules that best match your system rating and its flat efficiency curve (above 95% from full load down to 30% load and still above 94% further down to 20% load) ensures that the system is always optimized, dramatically reducing the energy waste.

Higher System Availability

Liebert® APM provides mission critical IT systems with the highest possible level of availability decreasing both MTBR, with Liebert® proven reliability, and MTTR, with the new hot-swappable FlexPower modules.

ENERGY EFFICIENCY
Liebert® APM has been designed to be the benchmark of efficiency for double conversion UPSs.

MODULARITY
With fewer basic building blocks you can build a Power source tailored to your needs and ready to evolve with them.

HOT SWAP
Up and running in few seconds thanks to the hot swappable modules.

COMPACT FOOTPRINT
A UPS and Battery system that could give you 60kW of UPS power complete with 10 minutes runtime in just 0.66sqm would have been unimaginable just a few years ago!

WIDER SAFE OPERATING AREA
Lagging or Leading Power factors, there's virtually no load that cannot be driven by Liebert® APM.

FLEXPOWER TECHNOLOGY™
Liebert® APM features FlexPower Technology™, which incorporates distributed intelligence and scalable power in a common assembly.

Liebert® APM: the Emerson answer to your next challenges

Liebert® APM, Efficient And Adaptive Power For All Your Critical Applications.

- High efficiency rating up to 96% in true online double conversion mode.
- FlexPower Technology™ allows the configuration of a completely redundant power and control system, sized to match the capacity of the protected equipment. The unit capacity is easily added, without increasing the system footprint.
- Parallel technology allowing four (4) parallel units, without the need for centralized bypass cabinet and additional external modules.
- Digital current sharing technology and high parallel reliability.
- Wide input voltage and frequency range to cope with the worst utility conditions.
- Intelligent battery management for automatic battery diagnostic and prolonged battery life.
- Thanks to the compactness of the power module, the best in the market, within the same rack there is room to accommodate internal batteries providing a backup time up to 30 minutes in the 30kVA configuration and up to 5 minutes in the 90kW configuration. Different combinations of internal and external batteries are available to cope with the various customers' scenarios.
- Flexible battery configuration: 30 to 40 batteries per string allow you to keep your existing battery solution in most cases.
- Lower mean time to repair (MMTR) with hot swappable modules.

Liebert® APM, up to 5 x 30KW power modules per rack and up to 4 UPS racks in parallel for all your power needs

The Best Investment You Can Make In A UPS System: Efficiency, Reliability And Value In A Compact Package.

Get The Most Out Of Your Investment

- Liebert® APM, with its unity power factor (kVA=kW), offers more real power to support customers' mission critical loads satisfying the requirements of the latest servers. With up to 96% double conversion online efficiency, Liebert® APM saves your operating cost compared to traditional UPS Systems.

Get The Optimum Protection

- Liebert® APM's outstanding efficiency curve lets you rely on the protection of Double Conversion Technology without compromising your solution. High overload protection handles 110% overload for 60 minutes, 125% for 10 minutes, and 150% for 1 minute.

Get The Minimum Footprint

Liebert® APM is a compact UPS with small footprint.

- It is the only UPS on the market that can achieve 30 minutes of backup time for 30kW or 10 min for 60kW or even 5 min for 90kW in just 0.66 sqm.

Get The Highest Availability

- Liebert® APM offers you the possibility to get vertical redundancy, by adding a module within the same rack and/or horizontal redundancy by adding a full redundant rack to the system.
- Also Tier 4, dual bus architectures are natively supported without the need of any additional option.
- With an input voltage window of 305V-477V and a frequency tolerance of 40Hz to 70Hz, Liebert® APM provides high quality power, even when input parameters are very far from nominal.
- Back-feed protection sensing ensures system integrity.

Ease of Maintenance

- Redundant configuration allows you to substitute one module while the others are working.
- Dual bus compatibility enables to transfer the load to an alternate power source for all maintenance activities.
- The Liebert® APM can be easily serviced thanks to front accessibility of critical components, self-diagnostics and various monitoring options.
- Large and user-friendly LCD display provides operating information in twelve different languages.

Additional Features:

- Monitoring: offers communications through Web (HTTP), Modbus and SNMP protocol.
- Flexibility: thanks to a variable number and type of batteries, to single and multi unit configurations, and to an array of internal and external power and communication options.
- Ultra-quiet performance with noise levels below 52 dBA.
- Extended battery life thanks to its wide input voltage tolerance of 305V-477V that reduces transfers to battery and subsequent charging and discharging cycles.
- Long battery life is further ensured by temperature compensated battery charging algorithm that helps to reduce recharge times while preventing excessive gassing, cell degradation and electrode damage.

Maximize your business up-time with the shortest MTTR that only modular architecture can achieve

System Architecture: Functional Blocks

Monitoring And Control Capabilities That Keep You Informed And In Charge. Integrated Control And Monitoring Main Display Screen

Liebert® APM has a large display that leads the user through logical menu sequences to view the required information. The micro-processor based display is autonomous from the system control logic. The simple menu-driven system virtually eliminates the possibility of human error. The large display can be set to show a system one-line diagram or mimic panel. It can also display advanced metering information, alarms, configuration or start-up/shutdown/transfer information.

- Quickly check operational status.
- Monitor power flow through UPS along with all meter readings.
- Menu-driven operator procedures to ensure safe operation.
- Check status reports and history files.
- Adjustment of programmable parameters (access limited by security access function).

Centralized Monitoring And Control For The IT Enviroment

Intended for the IT Manager, Liebert® Nform™ is a network communications system that will enable you to leverage the distributed monitoring capabilities of your network connected equipment. This software solution combines full-scale monitoring with cost-effective deployment through the use of the existing network infrastructure. It is both scalable and adaptable so it can grow as your systems expand and as your business needs change. Liebert® Nform™ can be configured to monitor your Liebert® APM for alarm notifications. These alarms can be processed to trigger event actions such as e-mail alerts or local notifications.

Centralized Monitoring And Control Through Your Existing Network

Liebert® SiteScan is a centralized site monitoring system assuring maximum visibility and availability of your critical operations. Liebert® SiteScan Web allows you leverage Web technology to oversee and control critical support systems - anywhere, anytime. Liebert® SiteScan Web allows you to monitor and control virtually any piece of critical support equipment - no matter if located in the next room or in a facility on the other side of the country. The web-based system provides centralized oversight of any Liebert® precision air, power and UPS units, as well as many other analog or digital devices. Features include real-time monitoring and control, data analysis and trend reporting, and event management.

Liebert® Nform - Monitoring Software 4.0

Liebert® SiteScan® Web

Liebert® APM Grows With Your Business.

Start Little, Think Big. Over dimensioning your data center from day one represents both a high CapEx and a high OpEx (the latter due to an un optimized efficiency). On the other hand under dimensioning it can imply down time and unnecessary installation costs if your equipment is not conceived to make future upgrades easy. Liebert® APM is designed expressly for a "pay-as-you-grow" deployment, making this process smooth and effective.

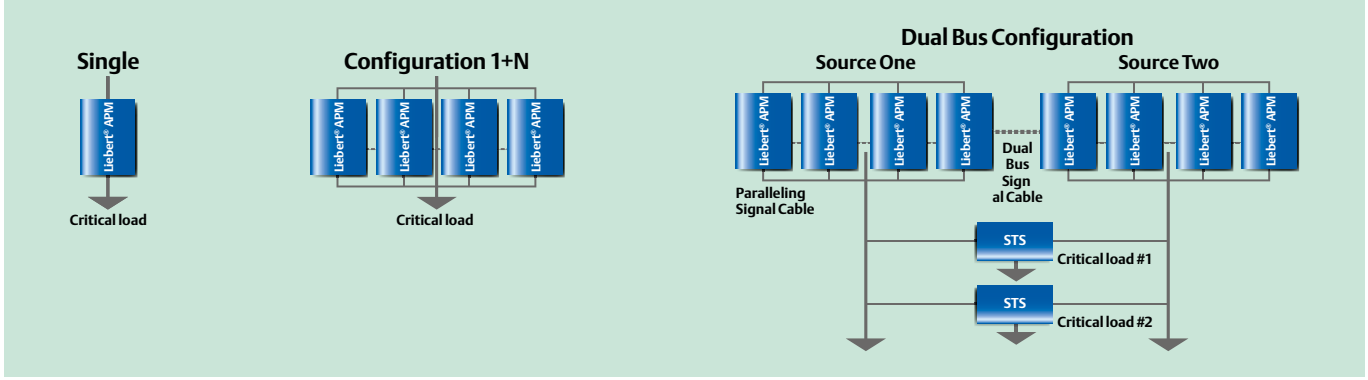
30kW+30kW redundant and 15' backup time

60kW+30kW redundant and 15' back up time

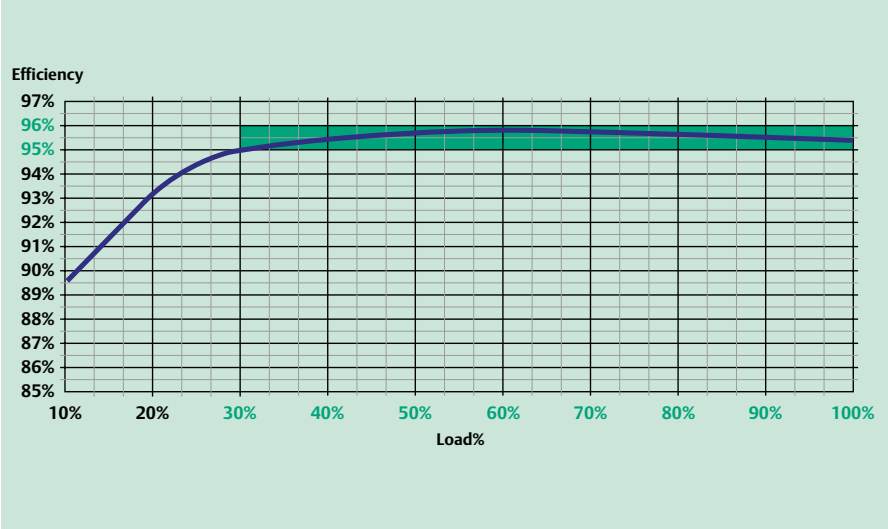
90kW+30kW redundant and 15' back up time

120kW+30kW redundant and 15' backuptime

Your Liebert® APM power system can be utilized with either single or dual power inputs. The dual power feature allows you to take advantage of a secondary power source. In addition, up to 4 racks can be paralleled to achieve increased redundancy or more power and 2 sets of racks can be deployed in a Dual Bus architecture.

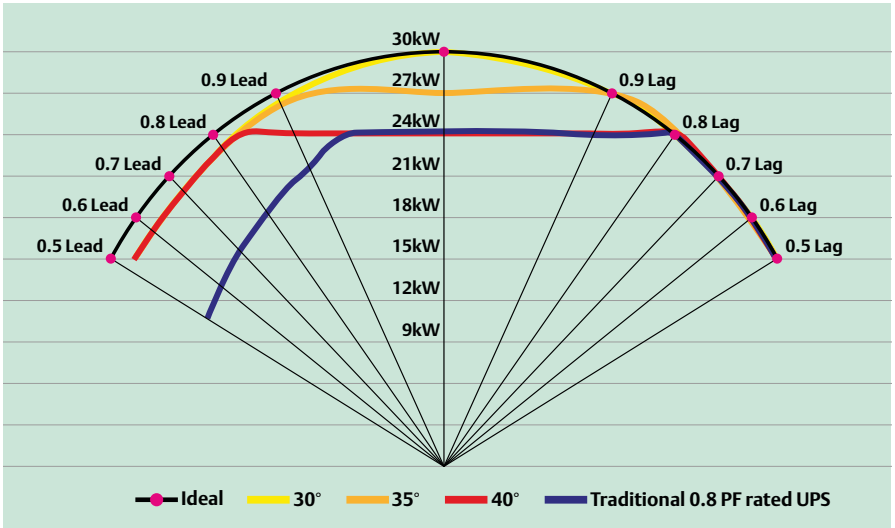


Best-in-class Electrical Performances



Maximum Efficiency At Any Load Level

Liebert® APM reaches the state of the art in terms of UPS efficiency achieving an efficiency level close to 96%. Most UPS's in real world installations don't work in a full load condition; they are commonly loaded between 60% and 70%. This is even truer in parallel redundant systems where each UPS carries half of the load, which can thus be as low as 35% or 30%. It is always a sound choice to keep a safety margin in case of increasing and peak loads, but it can compromise system efficiency. This is no longer true with Liebert® APM: with its ruler flat efficiency it delivers the maximum efficiency regardless of the load level.



Wide Safe Operating Area

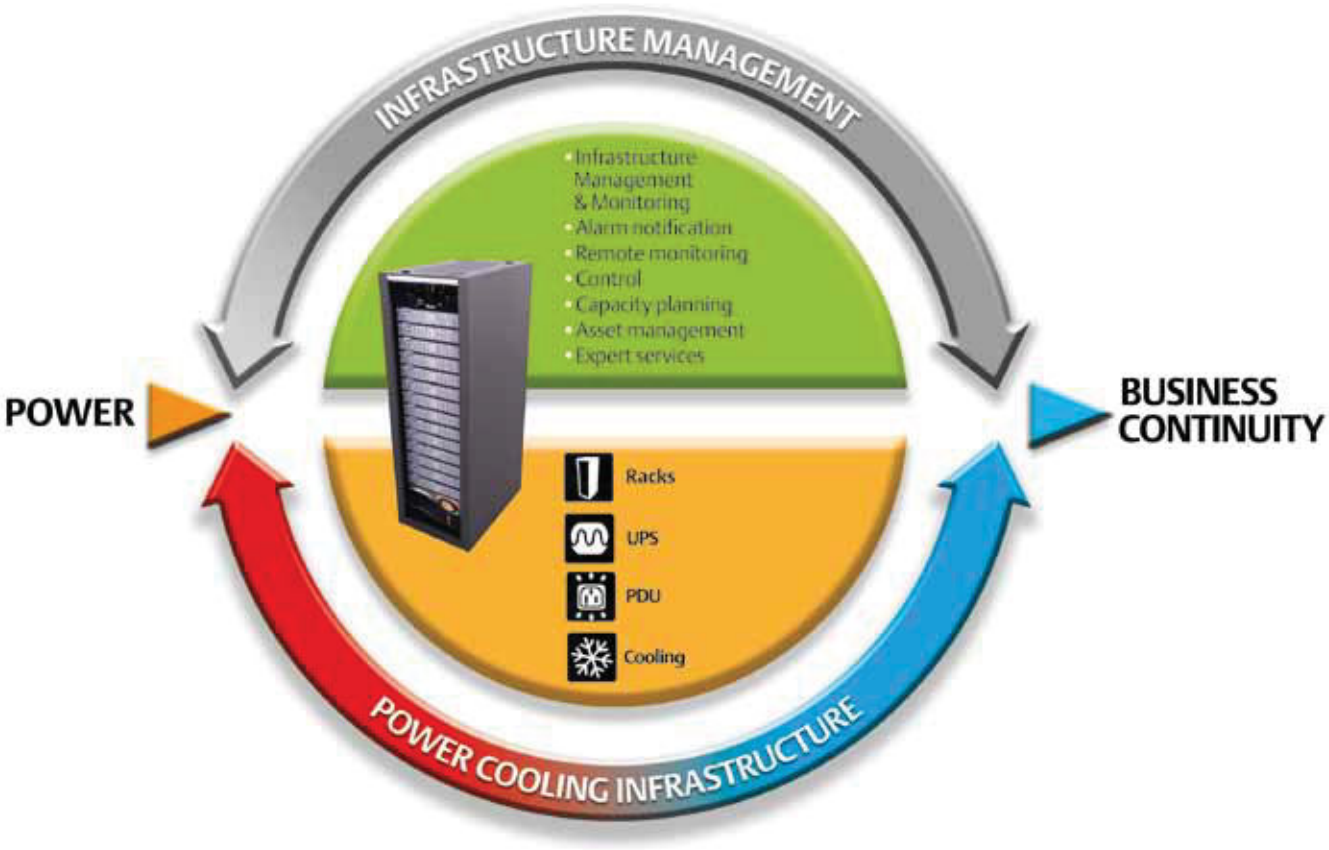
In the Polar Diagram the radius represents the kVA and the height represents the kW. An ideal power source is able to give the same amount of kVA regardless of the PF nature of the loads, so its polar diagram forms a circumference (black curve in fig 1). A traditional 0.8 rated UPS (blue curve) is able to do so just for loads with PF greater or equal to 0.8 lagging, then it starts kVA derating (flat part of the blue curve) and then also a kW derating. Liebert® APM pushes the limit ahead and, when kept in a controlled temperature environment, it behaves like an almost ideal power source. Even in non controlled temperature environments (40°) the achievements over traditional UPS's are amazing, showing just an extremely limited kVA derating.

Liebert® APM: Specifications

Technical Characteristics					
Model	APM				
Power (kVA)	30 kVA	60 kVA	90 kVA	120 kVA	150 kVA
Power (kW)	30kW	60 kW	90 kW	120 kW	150 kW
System efficiency					
AC - AC online double conversion	Between 95% and 96% for load >30%				
Input Parameters					
Rated input voltage	380/400/415 VAC, three-phase four-wire				
Rated operating frequency	50/60Hz				
Input voltage range	305V - 477V at full load, -25% to -40% with linear load de-rating				
Input frequency range	40Hz - 70Hz				
Input power factor	>0 .99 at full load, >0.98 at half load				
Input THDI	<4%				
DC Parameter					
Battery number	30,32,34,36,38,40				
Battery Compensation	Yes				
Maximum runtime with internal battery	30’	10’	5’	N/A	N/A
Charger output voltage regulation accuracy	1%				
DC ripple low voltage	≤1%				
Output Parameter					
Inverter output voltage	380/400/415 VAC, three-phase four-wire				
Inverter output frequency	50/60Hz				
Output frequency stability	50Hz/60Hz±0.02%				
Voltage stability					
Steady state	±1%, typical				
Transient state	+/-5%, typical				
Transient state response time	<20ms				
Inverter overload capacity	1 hour for 110%, 10 mins for 125%, 1 min for 150%, 200ms for >150%				
Phase Shift					
With 100% balanced load	<1°				
With 100% unbalanced load	<1.5°				
THDv					
100% linear load	<1°				
100% non-linear load	<1.5°				
Bypass Parameter					
Bypass input voltage	380/400/415 VAC, three-phase four-wire				
Bypass voltage range settable through software	Default: -20% to + 15%, other values, such as -40%, -30%, -10% to + 10%, +15%				
Bypass overload capacity	135% long term, 170% for 1 hour, 1000% for 100ms				
Environmental Conditions					
Operating temperature range	0 - 40˚C*				
Storage temperature	-25 to 70˚C				
Maximum Operating altitude	≤1 000m, when operating at 1000>2000m, derated by 1% for every 100 m increase of altitude				
Relative Humidity	≤95%				
Noise (1m)	52 - 62 dBA, adjusted according to load rate and number of modules				
IP Class	IP20				
Standards					
Low Voltage Directive	2006/95/EC with the Amendment Directive 93/68/EEC Directive for electromagnetic compatibility 2004/108/EC				
General and safety requirements for UPS used in operator access areas	IEC/EN 62040-1-1 incorporating requirements of IEC/EN 60950-1				
Electromagnetic compatibility (EMC) requirements for UPS	IEC/EN 62040-2: Immunity category C2, Emission category C2				
Method of specifying the performance and test requirements of UPS	IEC/EN/AS 62040-3				
Physical Parameters					
Dimension, w x h x d (mm)	600x1996x1100 mm				
Weight (kg)	280	315	350	385	420

* conditions apply

Emerson Network Power Business-Critical Continuity™ Expert



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


More than 35,000 organizations in 70 countries depend on our Business - Critical Continuity™ Promise: your IT infrastructure stays up to support your Business!

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

Emerson Network Power, a business of Emerson (NYSE:EMR), protects and optimizes critical infrastructure for data centers, communications networks, healthcare and industrial facilities. The company provides new-to-the-world solutions, as well as established expertise and smart innovation in areas including AC and DC power and renewable energy, precision cooling systems, infrastructure management, embedded computing and power, integrated racks and enclosures, power switching and controls, and connectivity. Our solutions are supported globally by local Emerson Network Power service technicians.
Learn more about Emerson Network Power products and services at **www.EmersonNetworkPower.com**

Locations

Emerson Network Power
Via Leonardo Da Vinci 16/18
Zona Industriale Tognana
35028 Piove di Sacco (PD) Italy
Tel: +39 049 9719 111
Fax: +39 049 5841 257

Via Fornace, 30
40023 Castel Guelfo (BO) Italy
Tel: +39 0542 632 111
Fax: +39 0542 632 120
enquiries.chloride@emerson.com

United States
1050 Dearborn Drive
P.O. Box 29186
Columbus, OH 43229
Tel: +1 614 8880246

Asia
7/F, Dah Sing Financial Centre
108 Gloucester Road, Wanchai
Hong Kong
Tel: +852 2572220
Fax: +852 28029250

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

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