

■ 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 datacenters, 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.

**That’s why we can say we OptimizeIT!**

**optimizeIT**  
Infrastructure Simplified.  
Support Unparalleled.



*In today's business there is no chance to fail*



# *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 enable to start with a basic configuration of 30kW which can grow with the business up to 150kW .

### **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 demands for new technologies, adaptable to customer 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, that is able to grow accordingly with your future requirements.

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

With Liebert APM You can Deploy any Number of Power Modules that best match your system rating and it's enhanced flat efficiency curve (above 95% up to 30% of load and above 94% up to 20% of load) thus ensure that the system is always optimized dramatically reducing the energy waste.

### **Higher System Availability**

Liebert APM provides a mission critical technology minimizing the single points of failure in your infrastructure. A UPS that delivers the highest possible level of availability to your IT system, decreasing both MTBR with Liebert proven reliability, and MTTR with the new hot-swappable power modules.



#### ENERGY EFFICIENCY

Liebert APM has been designed to be the benchmark of efficiency for double conversion UPS.



#### 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 be 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.*

The Liebert APM by Emerson Network Power is an efficient, space saving and flexible solution for your network. With Best In class true online double conversion efficiency of 96% in a compact, single frame 19" enclosure, Liebert APM keeps your network protected while saving on cost and datacenter space. With redundancy options and flexible battery configurations, Liebert APM provides same level of reliability you have come to expect from a Liebert UPS.

- High efficiency rating of up to 96% on 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 maintenance 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 customer scenarios
- Flexible battery configuration: 30 to 40 batteries per string allow you in most cases to keep your existing battery solution
- 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 customer's mission critical loads satisfying the requirements of the latest servers. With up to 96% online double conversion efficiency, Liebert APM saves you operating cost compared to traditional UPS Systems.

### Get The Optimum Protection

- Liebert APM's outstanding efficiency curve let's 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 low 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 0.66m2.

- High overload protection: Liebert APM handles 110% overload for 60 minutes, 125% for 10 minutes and 150% for 1 minute.

### Get The Highest Availability

- Liebert APM offers you the possibility to choose between internal module/vertical redundancy and/or external frame horizontal redundancy up to Tier 4, dual bus configuration without the need any external option of 305V-477V and a frequency tolerance of 40Hz to 70Hz to provide high quality power, even when input parameters are below standard. This helps to minimize the transfer to battery, reducing the charging and discharging cycles.
- Back-feed protection sensing ensures system integrity

### Ease of Maintenance

- Redundant configuration allows you to substitute one module while the other is working.
- Dual bus compatibility enables to transfer the load to an alternate power source for all maintenance activities. The Liebert APM

features easy access for servicing. 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

### Get The Liebert APM, Simply with Additional Features:

- Monitoring: offers communications through Web, Modbus and SNMP protocol.
- Flexibility: thanks to a variable number and type of batteries, to single and multi unit configurations, and an array of internal and external power and communication options.
- Ultra-quiet performance with noise levels below 52 dBA.
- Long-life batteries thanks to its wide input voltage tolerance down to 305V, reducing transfers to batteries. Moreover, Temperature compensated battery charging extends battery life.

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



## *System Architecture: Functional Blocks*

Dust filters

System display

1 To 5 power modules

0 To 5 internal battery modules

1 To 10 battery modules  
can be installed in an external  
rack for additional autonomy

Static bypass module

Maintenance bypass

External modular battery  
extended cabinet





## 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 of the system control logic. The simple menu-driven system virtually eliminates the possibility for 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 Environment

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 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 - whether it's 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

Choose your tier of protection



## Liebert APM Grows With Your Business.

Start Little, Think Big. Over dimensioning your Datacenter 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 this 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

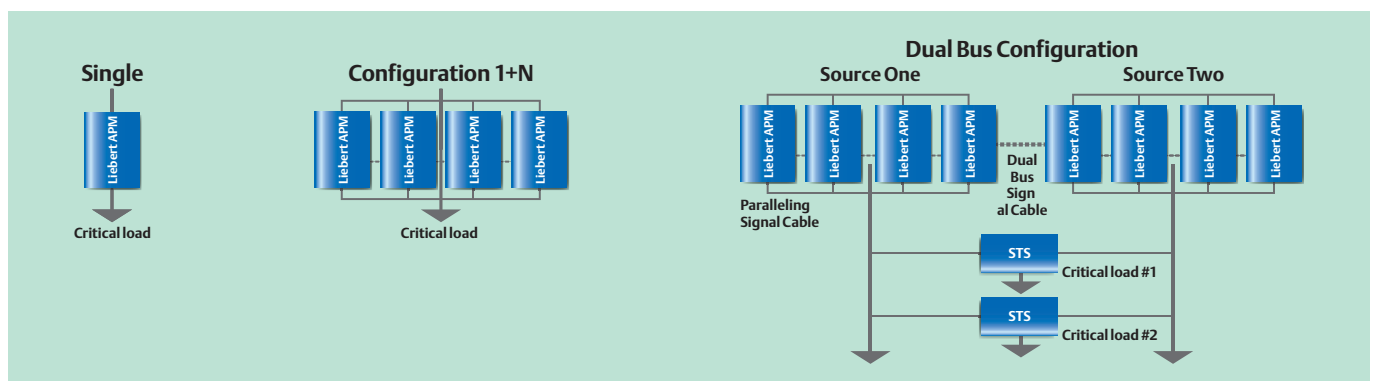


90kW+30kW redundant  
and 15' back up time



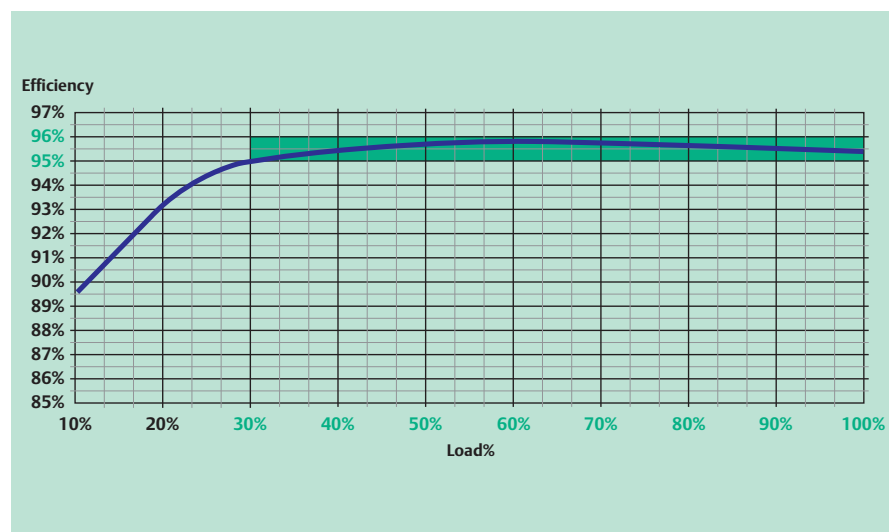
120kW+30kW redindant  
and 15' backuptime

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

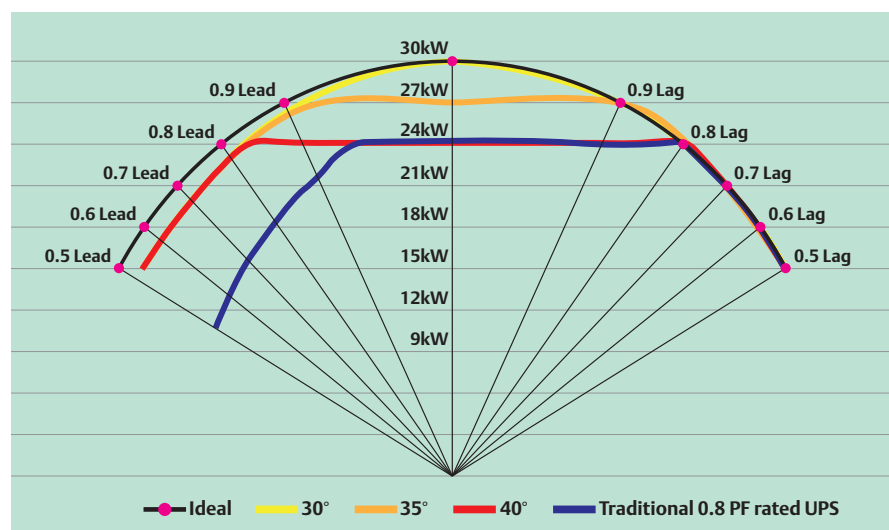


### Maximum Efficiency At Any Load Level

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 controller temperature environments (40°) the achievements over traditional UPS's are amazing, showing just an extremely limited kVA derating.

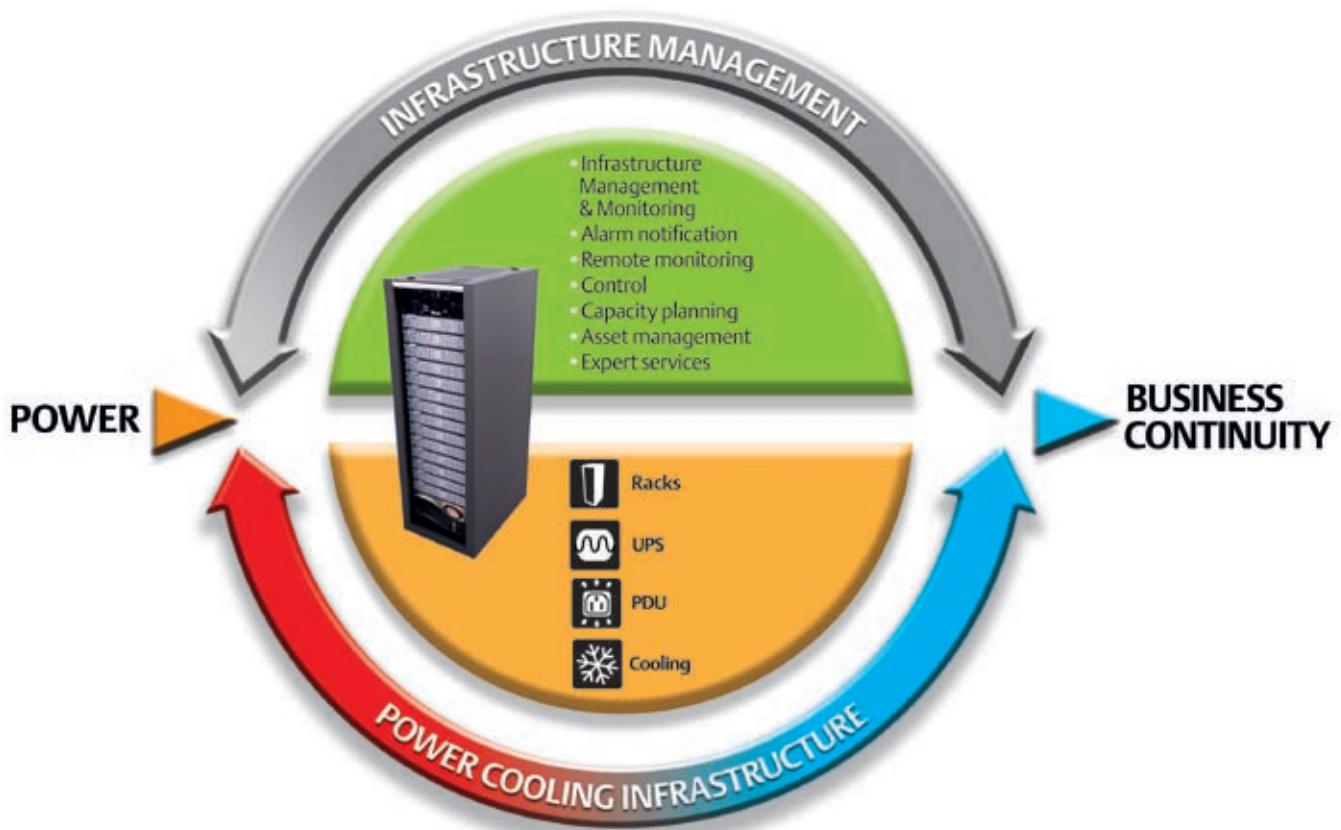


# LIEBERT APM: Specifications

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		3 05V - 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		<3%			
DC Parameter					
Battery number		30,32,34,36,38,40			
Battery Compensation		Yes			
Maximum runtime with internal battery		30'	10'	5'	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 datacenter 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.

*Get More on line: [www.eu.emersonnetworkpower.com](http://www.eu.emersonnetworkpower.com)*



*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), is the global leader in enabling *Business-Critical Continuity™* from grid to chip for telecommunication networks, datacenters, health care and industrial facilities. Emerson Network Power provides innovative solutions and expertise in areas including AC and DC power and precision cooling systems, embedded computing and power, integrated racks and enclosures, power switching and controls, infrastructure management, and connectivity. All solutions are supported globally by local Emerson Network Power service technicians. Liebert AC power, precision cooling and monitoring products and services from Emerson Network Power deliver Efficiency Without Compromise™ by helping customers optimize their datacenter infrastructure to reduce costs and deliver high availability.

For more information, visit:

[www.Liebert.com](http://www.Liebert.com), [www.EmersonNetworkPower.com](http://www.EmersonNetworkPower.com)  
or [www.Eu.EmersonNetworkPower.com](http://www.Eu.EmersonNetworkPower.com)

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### Emerson Network Power

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

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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Emerson Network Power Srl- ISO 9001:2008.  
Design, manufacturing, assembling and sales of chilled water  
mixture and equipment for high precision air conditioning.  
Sales of small uninterruptible power supply (UPS Small and Micro)



Emerson Network Power Srl-ISO 14001:2004:  
Design, manufacturing, assembling and sales of chilled water  
mixture and equipment for high precision air conditioning.  
Sales of uninterruptible power supply (UPS Power). Design  
of uninterruptible power supply (UPS Power). Sales of small  
uninterruptible power supply (UPS Small and Micro). HQ Service  
Activities (Spare parts warehouse, Technicians training)

