Trinergy™ from 200 to 1600 kW

High Power Modular Scalable UPS With Three Dynamic Functioning Modes

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 protects and optimizes critical infrastructure for data centers, communications networks, healthcare and industrial facilities.
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 grid to chip solutions, from the biggest to the smallest data centers, we are ready to serve your needs.

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.

Trinergy™ From 200 To 1600 kW

99% Efficiency: dynamic mode transitioning for first class performance and maximum load protection.

Class 1 UPS Efficiency Up To 99%

- Power interface on bypass
- Real-time input power tracking
- Intelligent algorithm for mode transitioning

An Industry First

Trinergy's revolutionary architecture comes from incorporating the three industry standard functioning configurations for the first time in one high power UPS:

- **Maximum Power Control (VFI)**
- **Maximum Energy Saving (VFD)**
- **High Efficiency and Power Conditioning (VI)**

Trinergy's unique combination of technology allows it to monitor the environment and operating conditions of the network before intelligently selecting the functioning mode best suited to the line conditions.

Trinergy's ability to choose the most efficient operating mode based on the different network conditions ensures that the supply to the load remains in optimum condition at all times.

This allows the system to achieve extraordinary energy savings, first class performance and maximum power protection.[1]

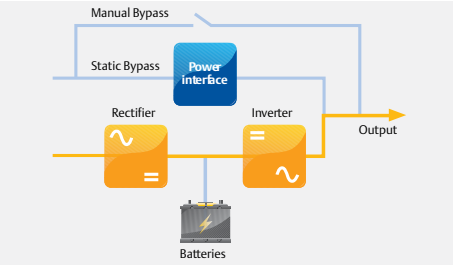
The high level of flexibility, energy efficiency and adaptability of Trinergy are in line with the European Union's Code of Conduct on Best Practices, thus further confirming its outstanding performance capabilities.

Features And Performances

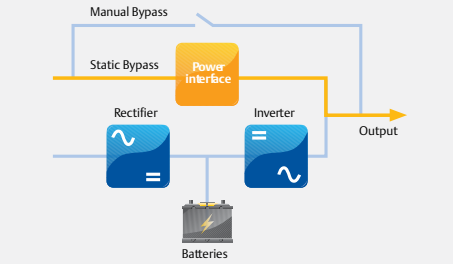
- Transformer free design
- Full IGBT double conversion technology
- Excellent input performances
  - PF > 0.99
  - THDi < 3%
- Output Power Factor 1
- Output Power Factor diagram symmetrical respect to zero
- Permanent 100% kVA - no derating with any load (lagging or leading)
- Optimum space/power ratio
- Automatic output power upgrade up to +10%
- High conversion efficiency (certified up to 99%).

1) Class 1 (IEC 62040-3) CBEMA

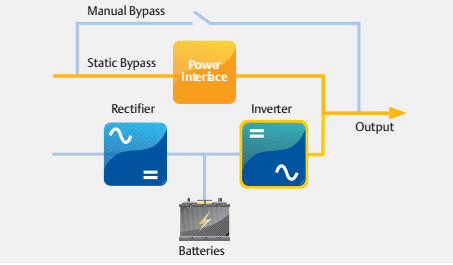
Dynamic Functioning Modes



Maximum Power Control (VFI)
provides the highest level of power conditioning and protects the load from all electrical network disturbances.



Maximum Energy Saving (VFD)
detects when conditioning is not required and allows the energy flow to pass through the bypass line.



High Efficiency & Power Conditioning (VI)
compensates the load THDi, PF and main sags and swells.

Minimized Total Cost Of Ownership

Maximized Savings
Trinergy™'s design features and outstanding efficiency up to 99%, greatly minimize the total cost of ownership from installation through to operation:

- Optimum space/power ratio
- Reduced footprint
- Reduction in size and power of air conditioning system
- Fast and safe maintenance

Delivering

- Minimized installation costs
- Minimized running costs
- Minimized air conditioning requirements
- 99% efficiency

Extraordinary Savings On Mains Input Equipment

The modular architecture of the Trinergy UPS allows for great advantages in terms of installation:

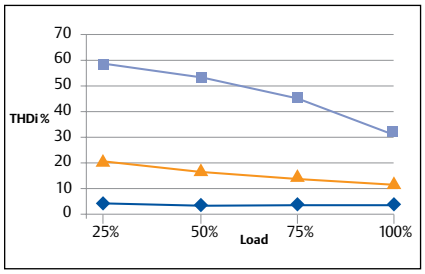
- Reduced size of electrical infrastructure
- Reduced size of circuit protection devices
- Reduced cabling

Trinergy features unitary input Power Factor and low content of harmonics providing full compatibility with gensets and greatly contributing to reduced installation and running costs.

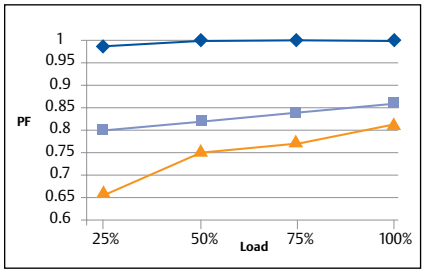
Running Cost Savings

Circular redundancy
Trinergy's circular redundancy feature adjusts available UPS capacity to meet immediate load requirements by automatically switching excess module capacity to standby, thus greatly improving efficiency at partial load and reducing operating costs.

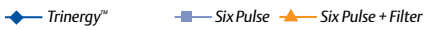
Air conditioning
The extremely high efficiency achieved with Trinergy reduces the energy dissipated by the UPS (kW), thus minimizing the demand and consumption of the air conditioning system.

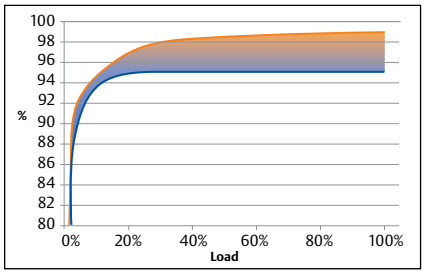


Input Harmonic Distortion vs Load Percentage

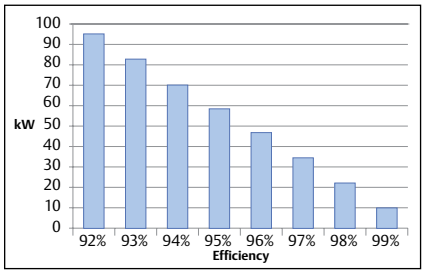


Input Power Factor vs Load Percentage





95 - 99% efficiency at down to 20% load



Air conditioning size & power reduced by 400%

the green grid℠
member

High Efficiency

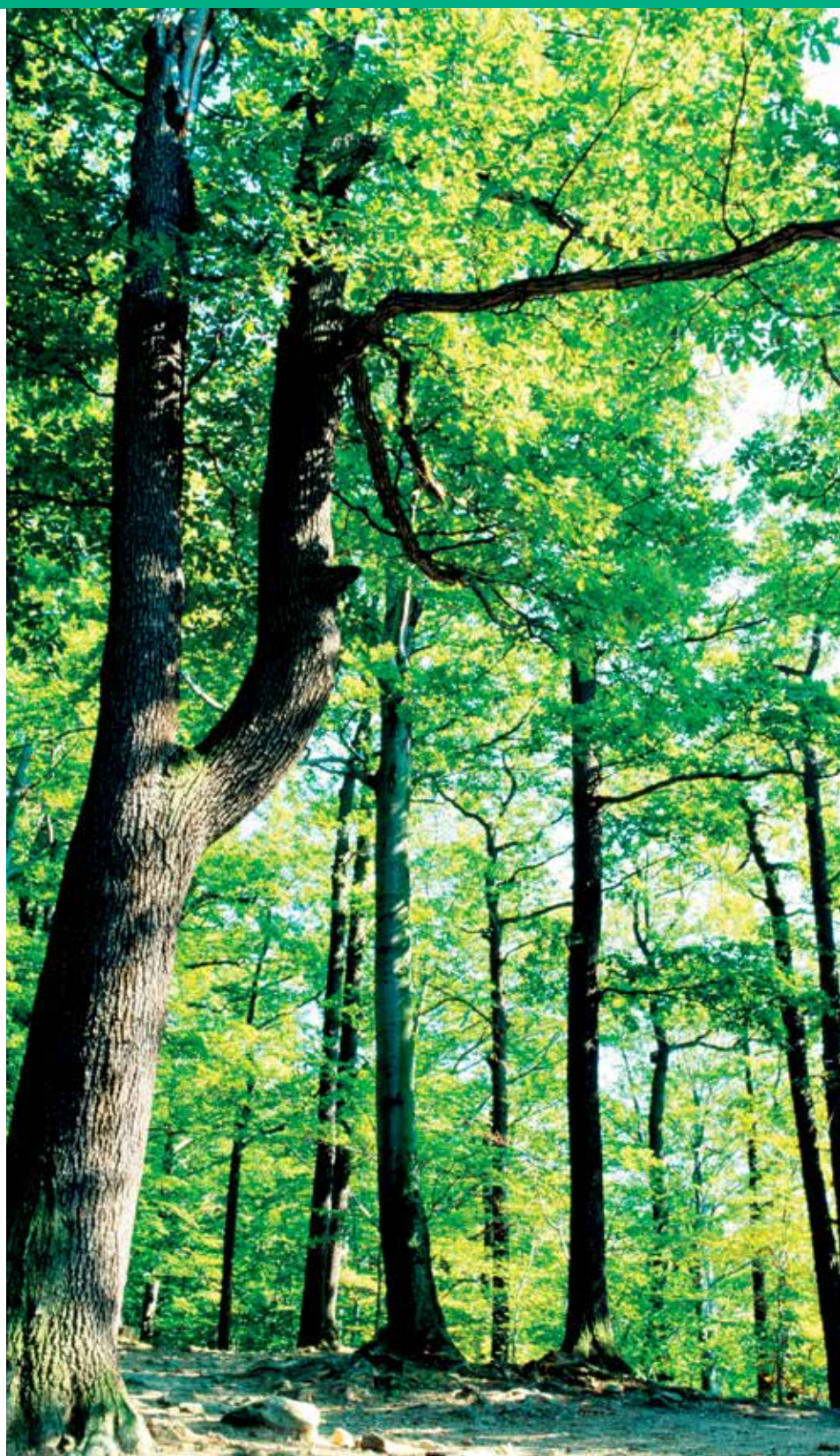
Trinergy™ 's unique architecture and technology have been purposely developed to enhance efficiency.

Able to discriminate between the different network input conditions and select the best functioning mode in relation to the disturbance, Trinergy can achieve maximum energy savings by using only the necessary amount of energy required to provide the best output power quality and conditioning to the load.

Advantages Include:

- Premium energy savings via transformer free technology and Trinergy's algorithm
- Quietest UPS in its power range
- Maximized battery life with Advanced Battery Care (ABC)
- Circular redundancy

High Efficiency



Sizing Your System

Scalable up to 9.6 MW; the highest active power rating available thanks to three dimensional modularity: Vertical, Horizontal and Orthogonal.

Vertical Modularity:
the stacked drawers in each module can be individually extracted for service purposes while the UPS system continues to protect your load.

Horizontal Modularity:
Trinergy™ can scale up to 1.6 MW in power by adding complete 200 kW UPS modules side-by-side and around the input/output power section.

Orthogonal Modularity:
is the ability of Trinergy to work with up to 8 complete UPS (fully populated with UPS modules) in parallel.

Three Dimensional Modularity

Trinergy™'s three dimensions of modularity allow businesses to expand their power protection needs at the same pace as their evolving load requirements by simply adding additional power modules. These three dimensions of modularity are built around Trinergy's I/O Box which is the major interface for connectivity and power connections as well as centralized and distributed battery configurations.

Modules can be added at anytime during the lifecycle of the UPS allowing it to reach up to 9.6 MW of active power, the most ever available in one UPS.

3 Dimensional Modularity

Servicing Critical Infrastructure

Proactive equipment maintenance reduces downtime and extends equipment life which in turn maximizes return on investment and increases system availability. Emerson Network Power supports entire critical infrastructures with an extensive service offering, guaranteeing network availability and total peace of mind 24/7.

Our approach to servicing critical infrastructure covers all aspects of availability and performance, from single units to entire mission critical systems, providing customers with tailored services to meet their individual business needs and further guaranteeing critical continuity.

Emerson Network Power's service program is designed to ensure that your critical power protection system is maintained in an optimum state of readiness at all times. The LIFE™ remote monitoring and diagnostic service provides early warning of UPS conditions and out of tolerances. This allows effective proactive maintenance, fast incident response and remote trouble shooting, giving customers complete security and peace of mind.

Maximize Availability

Pre-Emptive Maintenance

Regular preventive maintenance increases uptime. Emerson Network Power's LIFE provides early warning of operating anomalies allowing real-time diagnosis and swift identification and resolution.

Minimize Downtime

Immediate Identification of Problems

Should an emergency condition arise, an engineer in the 24/7 manned LIFE service center carries out an immediate fault analysis and instigates appropriate corrective action.

Reduce Operating Costs

Superior Asset Management

Through comprehensive data collection and analysis, LIFE's detailed reporting system provides valuable information on power and equipment trends, over any selected period of time.

Connectivity And Tracking

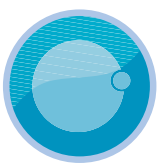
Real-time connectivity, tracking and LIFE remote diagnosis ensure that your system is closely monitored 24 hours a day.

LCD Touch Screen Features

- High security access with separate password levels for users and service engineers
- User-friendly graphical interface
- Single-line mimic diagram showing system status
- Contemporary dashboard-style indicators for major system values and conditions
- Automatic charting display for logged power and environmental data

Information Tracking

- Overall system and module readiness
- Module level alerts for all major subsystems including rectifier, inverter, batteries, static switch and bypass
- System voltages and power
- Load vs. capacity indicator



LIFE™ Diagnostics

- System temperature gauge
- Battery charge indicator
- Service history logs

Hardware Connectivity

The touch screen display ensures the monitoring and control of networked UPS, through two different options of the TCP/IP protocol:

- The integration of UPS with Building Monitoring and Automation Systems via MODBUS RTU, MODBUS/TCP or JBUS protocols
- The integration of UPS in Network Management Systems through SNMP protocol

Software Connectivity

Liebert® Nform will monitor the UPS via SNMP protocol. Authenticated alarm management, trend analysis and event notification delivers a comprehensive monitoring solution. Available in a variety of versions to suit anything from small computer rooms to multiple location distributed IT networks, Liebert® Nform enables:

- Condition based system state recording
- Alarm event exporting to disk
- SMTP email
- Execution of external program
- Shut down clients

System status, measurements and single-line diagram.

Trellis™ Platform

Emerson Network Power's Trellis™ platform is a real-time infrastructure optimization platform that enables the unified management of data centre IT and facilities infrastructure.

The Trellis™ platform software can manage capacity, track inventory, plan changes, visualize configurations, analyze and calculate energy usage, and optimize cooling and power equipment as well as enable for virtualization.

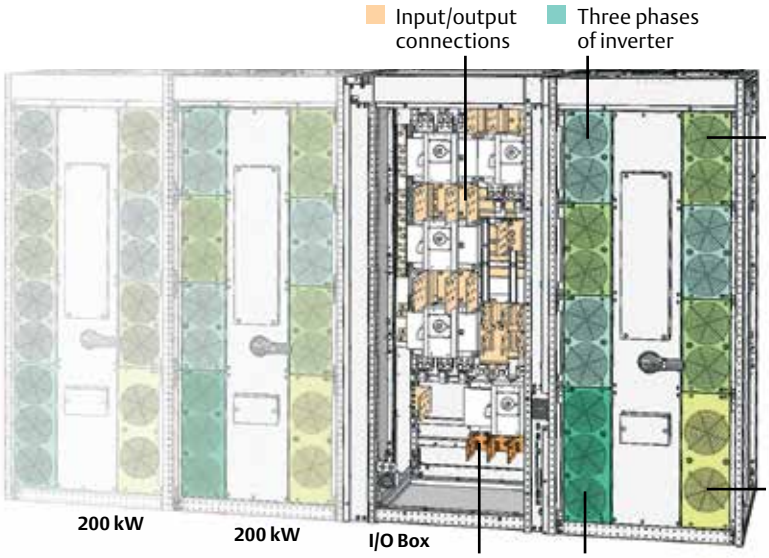
The Trellis™ platform monitors the data center, providing a thorough understanding of system dependencies to help IT and facilities organizations keep the data center running at peak performance. This unified and complete solution, delivers the power to see the real situation in your data center, make the right decision and take action with confidence.

trellis™

In The Field

100% uptime: optimum scalability and fast installation and service guarantee maximum load availability.

CAD - Trinergy™ internal architecture



Faster Installation And Service

Trinergy™'s modular design facilitates installation by allowing the UPS to be assembled on-site, module-by-module, making it ideal even for sites with difficult accessibility.

Upgradable In The Field

Trinergy can be configured to suit immediate load requirements as additional modules can easily be added/removed to respond to changing load demands.
This feature minimizes initial capital investment and ensures that the UPS system operates at a significant percentage load in order to ensure optimum system efficiency.

Accessibility

Modules are easily accessible from the front of each cabinet, allowing simplified service and maintenance to be carried out.

Serviceability

Concurrent Maintainability
Allows single modules to be serviced while the remaining modules continue to supply power to the load.

Internal Redundancy
The system is configured so that any individual unit can be easily isolated for safe maintenance whilst the remaining modules continue to provide conditioned power to the load.

High Reliability (MTBF)
Is achieved through the possibility of adding internal redundancy to the system. This can be based on a common battery bank for the whole system, or using distributed batteries i.e. a battery bank for each 200 kW UPS module.

Simplified Maintainability (reduced MTTR)
The multi-module concept that enables a user to define the level of redundancy required ensures a reduced Mean Time To Repair (MTTR) of individual UPS modules.

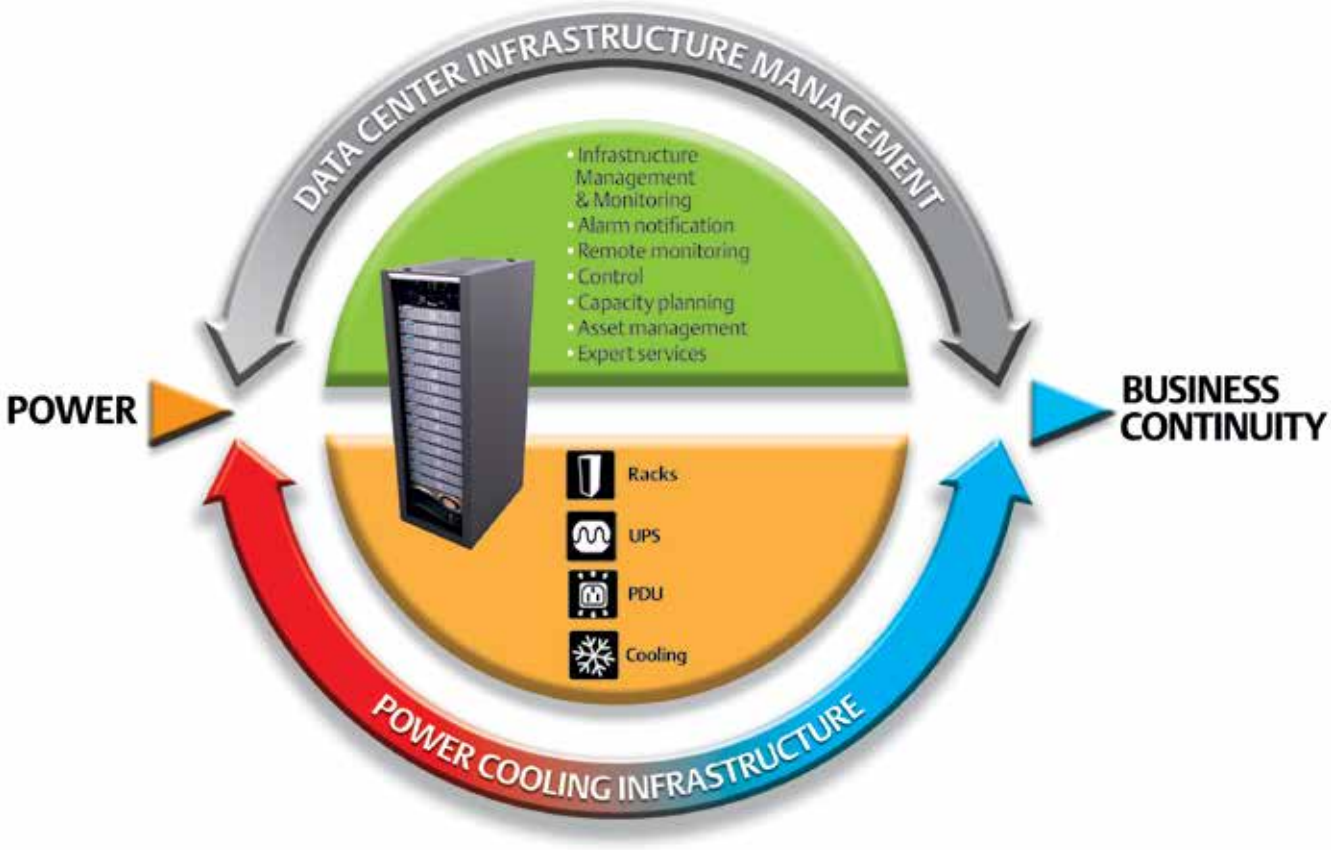
Improved Load Availability
Trinergy™'s proven reliability and simplified maintainability guarantee uninterrupted availability of power for critical loads.

Trinergy™ Specifications

Technical Characteristics							
Rating	**400**	**600**	**800**	**1000**	**1200**	**1400**	**1600**
Nominal output active power at 40° C (kW)	400	600	800	1000	1200	1400	1600
Apparent nominal output power at 40° C (kVA)	400	600	800	1000	1200	1400	1600
Apparent nominal output power at 25° C (kVA)	440	660	880	1100	1320	1400	1760
Redundant configuration active power (N + 1) (kW)	200	400	600	800	1000	1200	1400
Input							
Nominal primary mains input voltage/voltage range (V)*	400 (250 to 460), three phase + neutral						
Nominal bypass input voltage/voltage tolerance (V)	400 ± 10% (380 V, 415 V selectable) three phase + neutral						
Nominal input frequency/frequency tolerance (Hz)	45 - 65 Hz						
Input current distortion (THDi) (%)	<3						
Primary input Power Factor	>0.99						
Output							
Nominal output voltage (V)	400 (380 V, 415 V selectable) three phase + neutral						
Output voltage stability by load variation 0 - 100% (%) **- static** **- dynamic**	 ± 1 Complies with IEC/EN 62040-3, Class 1						
Output frequency (nominal) (Hz)	50 (60 Hz selectable)						
Output frequency variation (%) **- with mains synchronization** **- with internal reference**	 ± 1 (2, 3, 4 selectable) ± 0.1						
Inverter overload capacity*	125% for 10 min., 150% for 1 min.						
Compatibility with loads	Any power factor (leading or lagging) up to 1 without output derating; crest factor up to 3:1						
Automatic adjustment of nominal output power with temperature	110% at 25°C, 100% at 40°C						
General							
Classification according to IEC/EN 62040-3	VFI - SS - 111						
Operating temperature (°C)	0 - 40						
Relative humidity (without condensation at 20°C)	<95%						
Protection level	IP 20						
Frame colour	RAL 5004						
Noise at 1 m (dBA)*	71	73	74	75	76	77	78
AC/AC efficiency (%) with Trinergy™ technology	up to 99%						
Parallel configuration	up to 8 UPS* = Max 9.6 MW						
Dimensions And Weight							
Height (mm)	1780						
Width (mm)	1800	2775	3450	4450	5125	6900	7600
Depth (mm)	860	860	860	860	860	880	880
UPS weight (kg)	1450	2370	3040	3890	4560	5100	5700

* Conditions apply

More than 35,000 organizations in 70 countries depend on our expertise.



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.

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

About Emerson Network Power

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

MKA4L0UKTRIN Rev.4-09/2013

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