Trinergy™ Cube from 250 kW to 3 MW

Beyond the Power Revolution

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.


EMERSON
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Trinergy Cube
AC Power Systems

Trinergy™ Cube
The New Generation of Trinergy UPS Delivering Unsurpassed Performance to Enterprise Data Centers

Highlights

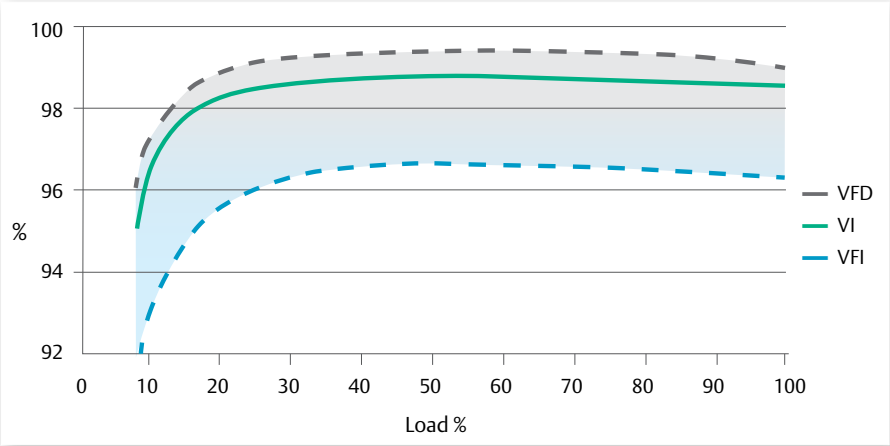
- Highest average operating efficiency in the industry: 98.5%
- Hot scalability up to 3 MW in a single unit and over 20 MW in a parallel system
- Unprecedented levels of installation flexibility
- Smart capacity - adaptive power rating
- LIFE™ remote diagnostic and preventive monitoring services

Designed around your IT space, **Trinergy Cube** is ready to evolve with growing business demands. It offers the highest level of power availability as well as reduced TCO, minimum energy consumption and CO_2 emissions.

Trinergy Cube boasts unparalleled features including an **average operational efficiency of 98.5 %** and power density per core running up to 400 kVA.
Its optimized efficiency at partial load conditions and hot scalability up to 3 MW means that **Trinergy Cube** delivers adaptability not available anywhere else in the market.

Trinergy Cube's hot scalability, allows it to meet any power system requirement from 250 kW to over 20 MW in parallel.

Trinergy Cube goes beyond the power revolution, to allow the greatest advantages in terms of availability, capacity and efficiency.



Trinergy Cube average operating efficiency of 98.5%

#BeyondPowerRevolution

Availability - Uptime Enhancement

Trinergy™ Cube makes your mission critical space a peaceful place through its advanced diagnostic capability, data tracking, measuring and logging, as well as predictive maintenance and event analysis features. Combined with a fault tolerant architecture, concurrent maintainability and hot scalability, **Trinergy Cube** guarantees continuous operation and premium protection for your customers' business.

Key availability features:

- **Remote Diagnostics**: LIFE™ remote diagnostic and preventive monitoring service, increases uptime and operational efficiency by continuously monitoring and tracking performance trends.
- **Predictive Maintenance**: **Trinergy Cube** is capable of verifying the health of its IGBT, capacitors, fans, contactors and batteries to determine maintenance needs and ensure critical continuity.
- **Event Analysis**: precise event tracking, waveform capturing and harmonic spectrum analyses allow the detection of external phenomena that have the potential of impacting data center availability.
- **Data Logging**: **Trinergy Cube** is capable of capturing all relevant data from efficiency to uptime parameters. Access to this information allows data center managers to control their physical space, optimize its usage and independently calculate PUE.

***Trinergy Cube** LCD touch screen: interface for data tracking, logging and event analysis*

#NextGenUPS

Sizing Your System

Scalable to over 20 MW; the highest active power rating available thanks to three dimensional modularity: Vertical, Horizontal and Orthogonal.

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

Horizontal Modularity:
Trinergy™ Cube can scale up to 3 MW in power by adding complete cores (UPS modules) side-by-side and around the input/output power section.

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

Capacity & Installation Flexibility

With its high power density cores, **Trinergy™ Cube** is the only static UPS today able to reach up to 3 MW in a single unit, thus allowing extraordinary capacity levels. Furthermore, its new generation architecture and connection types allow **Trinergy Cube** to deliver unprecedented levels of installation flexibility. The system can thus be configured in a vast range of layouts, whether it be a **straight row, L-shape or back-to-back**, the system easily adapts to available floor space.

Adaptability

The **Trinergy Cube** architecture and flexibility features deliver significant infrastructure upgrade cost savings, easily adapting to new or existing installations without impacting power infrastructure.
This is possible through:

- Hot scalability - minimized initial investment (CAPEX), adding power cores as business demands grow
- Centralized and distributed paralleled capabilities
- Simplified cable routing with unlimited input/output power connection availability
- Three dimensions of modularity for maximum capacity or redundancy
- Smart Capacity - adapting required power to meet the specific installation conditions in terms of climate management and circuit breaker size
- Three and four wire - allowing effortless replacement of legacy equipment
- Seismic compliance - ensuring power protection is available in any geographical location from Italy to Japan.

Smart Capacity Adaptive Power Rating

Trinergy Cube intelligently adapts load power supply to respond to the environment conditions of the installation site. The system's I/O Box and cores are rated to operate continuously up to 55°C and provide increased power down to 20°C. Furthermore, the maximum input current is adjustable to meet specific protection rating requirements.
Trinergy Cube's smart capacity ensures the best possible usage of physical infrastructure, providing maximized power to the load and optimizing each individual configuration based on the specific site conditions.

Unparalleled Efficiency

Trinergy™ Cube delivers an unparalleled **98.5%** average operating efficiency and up to 99.5% maximum efficiency, thus reducing operating costs to a minimum.

The unparalleled levels of efficiency and consequent electricity cost savings can be attributed to:

- Latest generation IGBT
- Adoption of a three-level NPC2 topology for both rectifier and inverter
- Hot scalable power cores
- Three dynamic functioning modes (VFI, VFD, VI)
- Adaptive fast transfer

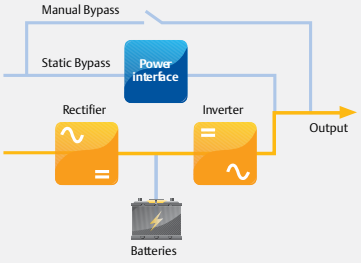
The seamless activation of **Trinergy Cube**'s functioning modes ensures the highest level of efficiency without compromising power quality and availability.

The adaptive fast transfer ensures the quickest response time under various conditions:

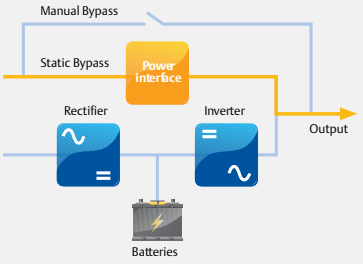
- Network fault (voltage variation, high/low impedance mains failures)
- Load fault (short circuit downstream of the UPS)
- Type of load connected (PDU transformer)

The unit is able to discriminate between the various types of interferences and rapidly respond, while at the same time ensuring compatibility with downstream equipment such as servers, transformers, STS or mechanical loads.

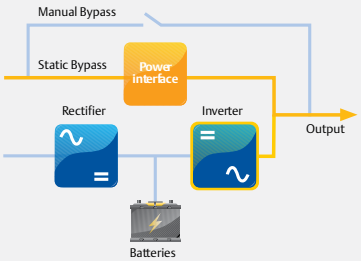
Maximum Power Control (VFI) provides the highest level of power conditioning and protects the load from all electrical network disturbances.



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



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



***Trinergy Cube** dynamic functioning modes*

#TrinergyCube

Optimized TCO

Continuous availability, unparalleled operating efficiency, optimized installation space, smart capacity and minimized electrical infrastructure costs, make **Trinergy**™ **Cube** the ultimate UPS solution with an optimized TCO and rapid return on investment.

Trinergy Cube is the only unit in the market which allows for hot scalability from 250 kW up to 3 MW in a single UPS, thus providing significant electrical infrastructure and space savings. Furthermore, its high power density running up to 400 kVA per core, allows customers to maximize the number of racks and servers housed in their data center, thus granting more space for IT equipment.

Trinergy Cube's highly efficient technology and TCO capabilities also come from Emerson Network Power's expertise in the area of thermal management. An in-depth study of the ventilation system and internal aerodynamics of the unit has brought extraordinary results in terms of power density and power adaptability for efficient operation in all climates.

Neutral Carbon Footprint

Trinergy Cube's new generation architecture has been designed to reduce energy and heat dissipation, thus minimizing the demand and consumption of air conditioning systems. The combination of these factors, coupled with its 98.5% average operating efficiency, reduces CO_2 emissions to a minimum. This contributes to ensuring that your customers' data centers are a step closer to meeting the industry's environmental and efficiency compliance standards.

LIFE™ Remote Diagnostic and Preventive Monitoring Service

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 diagnostic and preventive monitoring 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.

With **LIFE** services you will benefit from:

Uptime Assurance
Constant monitoring of UPS parameters, thus maximizing the system's availability.

First Time Fix Rate
Pro-active monitoring and data measuring ensure that when our customer engineers are dispatched on-site, they arrive prepared for first time resolution.

Proactive Analysis
From **LIFE** service centers, our experts proactively analyze the data and trends of your equipment, to recommend actions to ensure their best performance.

Minimized Total Cost of Ownership of Your Equipment
The continuous monitoring of all relevant parameters in turn maximizes unit performance, reduces on-site maintenance and extends the life of your equipment.

Fast Incident Response
LIFE allows for immediate definition of the best course of action, as a result of the regular communication between your **Trinergy™ Cube** system and our **LIFE** service centers.

Reporting
You will receive a comprehensive report detailing the working order of your equipment and its operational performance.

#LIFERemoteService

Customer Monitoring Interfaces

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

Hardware Connectivity

Trinergy™ Cube allows for the monitoring and control of networked UPS, through different protocol options:

- 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
- Two slots for additional connectivity cards are available for specific protocol requirements.

Software Connectivity

Liebert® Nform™ will monitor the **Trinergy Cube** 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

Liebert SiteScan® is a centralized site monitoring system which ensures maximum visibility and availability of critical operations. Liebert SiteScan Web allows users to virtually monitor and control any piece of critical support equipment. Its features include real-time monitoring and control, data analysis, trend reporting, and event management.

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.

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™

Customer Experience Center

Emerson Network Power's state-of-the-art Customer Experience Center located in Castel Guelfo (Bologna - Italy), enables our customers to experience first-hand a wide variety of data center technologies, supported by constant consultation from R&D and engineering specialists.

Customers visiting the center will be able to witness pre-installation demonstrations, covering the technical performance, interoperability and efficiency of Emerson UPS systems under real field conditions. These processes can be experienced from the facility's control room, where real-time performance measurements and reporting will be available while providing full visibility of the demonstration area. The center can host simultaneous tests at full load of up to 4000 A.

The customer validation area specifically dedicated to UPS consists of four testing stations, each one providing up to 1.2 MVA of capacity. Testing includes individual modules, as well as complete power systems, with the added possibility of the customer's switchgear support systems being connected, thus guaranteeing smooth, rapid installation and commissioning of large power systems.
Testing is also customized based on the complexity, size and number of UPS components in the configuration.

Our Customer Experience Center offers three validation experiences:

- Demo - carried out on new products to demonstrate UPS performance
- Standard - validation test showing UPS standard technical performances in compliance with UPS catalogue and IEC 62040-3 standards
- Customized - session tailored to validating customer's specific technical performance needs.

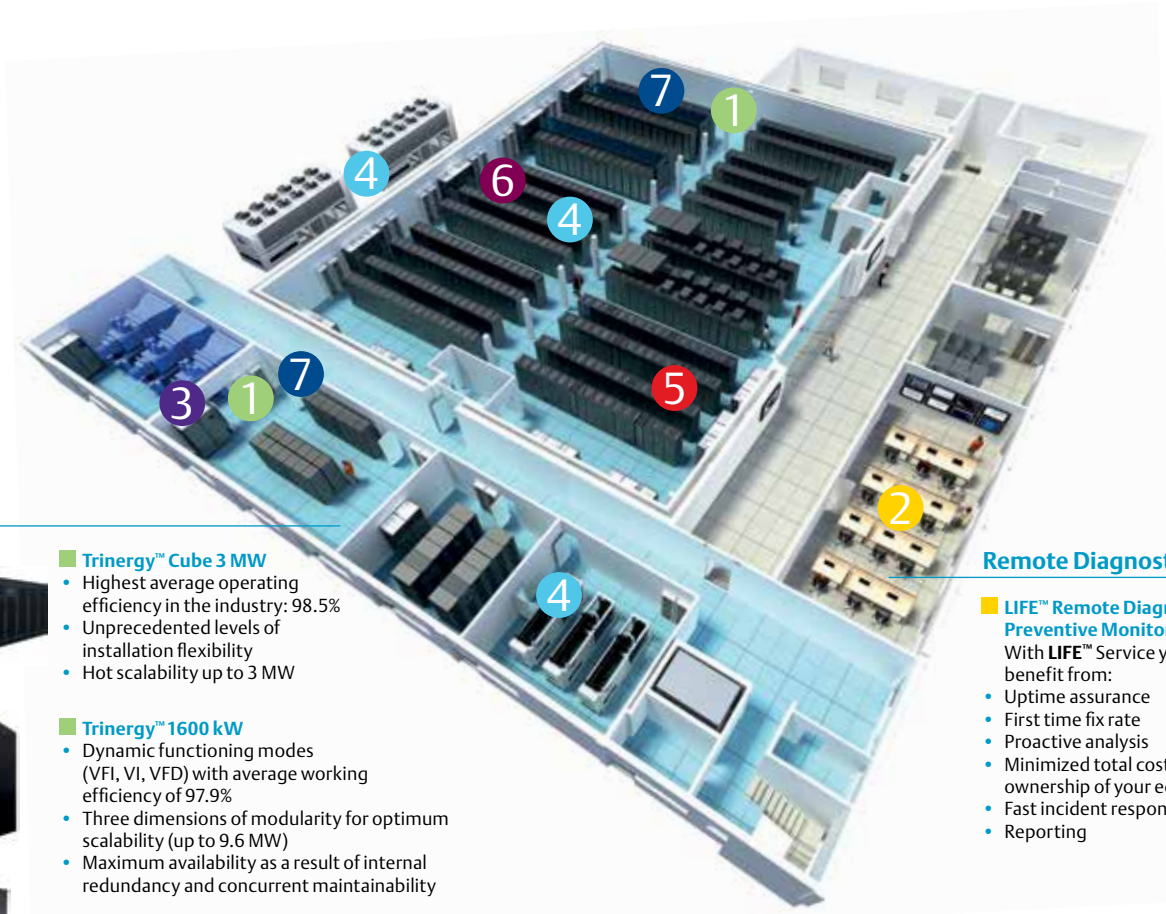
#CustomerExperienceCenter

Trinergy™ Cube Specifications

Technical Specifications		
System Range 250 kW - over 20MW		
Core Adaptive Power Rating (kVA)		400-250
Core Adaptive Power Rating (kW)		360-250
General		
Average Operating Efficiency		98.5%
Maximum Efficiency		up to 99.5%
Airflow (m^3/h)		2800
Heat Dissipation at Full Load in VFI (kW)		17-9
Paralleling		up to 10 cores in one unit, up to 8 units in parallel
Hot Swappable core		Yes
Withstand Rating (kAIC)		65
Audible Noise (dB)		< 73 dB
Altitude Max (m)		1000 m without derating
Operating Temperature (°C)		0-55
Input		
Input Wiring		3 ph + N + PE, 3 ph + PE
Input Voltage Range (V)		200-480
Input Frequency Range (Hz)		45-65
Input Power Factor		0.99
Input THDi		3%
Soft Start Capability		Yes
Internal Backfeed Protection		Optional
Output		
Output Wiring		3 ph + N + PE, 3 ph + PE
Configurable Voltage Rating		380, 400, 415 V, 440 V, 50/60 Hz
Permitted Load Power Factor		up to 1, any PF leading or lagging without derating; crest factor up to 3:1
Output UTHD		<3% (100% linear load); <5% (reference non linear load)
Overload on Inverter		5 min 125%; 30 sec 150%
Short Circuit Current (A)		1300/850
General Characteristics		
HMI		12-inch Color Touchscreen Including Web, SNMP, MODBUS/Jbus Protocols
Multi-language		Standard
Battery		
Type		VRLA (Li On, Flywheel on Request)
Charging Method		ABM Technology or Float
Battery Voltage Range		396-700
Selectable Charging Current		5-150
Dimension and Weight	**(W x D x H mm)**	**(kg)**
Core	675 x 910 x 1950	610
I/O Box for up to 2 Core Connection	1600 x 910 x 1950	950
I/O Box for up to 4 Core Connection	2100 x 910 x 1950	1320
I/O Box for up to 6 Core Connection	3300 x 910 x 1950	On request
I/O Box for up to 8 Core Connection	4000 x 910 x 1950	On request
I/O Box for up to 10 Core Connection	2500 x 1820 x 1950	On request
Accessories		
	External Battery Cabinets with Long-life Batteries, Li-Ion Batteries and Flywheel on Request, Intellislot Connectivity, Maintenance Bypass Switch	
Communications		
Slots		2 Intellislots
Protocols		SNMP, MODBUS TCP/IP, MODBUS RTU
Inputs/Outputs		9/8 Programmable
Compliance with Standards		
Safety		IEC 62040-1, IEC 60950-1
EMC		IEC 62040-2
Performance		IEC 62040-3

Emerson Network Power

Data Center Infrastructure for Large Applications



UPS

Trinergy™ Cube 3 MW
- Highest average operating efficiency in the industry: 98.5%
- Unprecedented levels of installation flexibility
- Hot scalability up to 3 MW

Trinergy™ 1600 kW
- Dynamic functioning modes (VFI, VI, VFD) with average working efficiency of 97.9%
- Three dimensions of modularity for optimum scalability (up to 9.6 MW)
- Maximum availability as a result of internal redundancy and concurrent maintainability

Liebert® NXL 800 kVA
- UPS for critical high power applications
- Provides greater power capacity along with superior reliability
- Meets power requirements and energy efficiency in high availability data centers

Static Transfer Switch

Chloride CROSS
- Ensures redundant power for critical loads, switching between two independent power sources
- Solid-state transfer switch available as 2/3/4P versions with full PF range to guarantee compatibility with all load types
- Extremely reliable and flexible architecture

Remote Diagnostics

LIFE™ Remote Diagnostic and Preventive Monitoring Service
With **LIFE™** Service you will benefit from:
- Uptime assurance
- First time fix rate
- Proactive analysis
- Minimized total cost of ownership of your equipment
- Fast incident response
- Reporting

1 AC Power

2 Infrastructure Management & Monitoring

3 Power Switching & Controls

7 DC Power

4 Thermal Management

5 Racks & Integrated Cabinets

6 Surge Protection

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**

MKA4L0UKCUBE Rev.1-04/2014

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