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THREE-PHASE STANDALONE UPS SYSTEM

## **TLE Series UL 160–1000kW UPS**

Clean, reliable power for your critical load  
with ABB's TLE Series UPS





# Reliable power for today's digital world with the high-efficiency TLE Series UPS

## **ABB's TLE Series UPS UL 160–1000kW**

The TLE Series is one of the best-performing three-phase UPS systems for providing critical power protection in a wide range of applications. The UPS operates in VFI (voltage frequency independent) mode and uses an innovative control algorithm with three-level converter technology to achieve very high efficiency levels. This innovative product provides best-in-class efficiency in both double conversion mode and in eBoost™ operating mode. The TLE

Series UPS provides industry-leading reliability and efficiency, as well as clean power and unity power factor at the output. Reliability can be further increased by using ABB's unique RPA™ (redundant parallel architecture) technology to operate multiple units in parallel. Throughout their entire life cycle, all ABB UPS systems are fully supported by teams that provide training, application expertise and 24/7 preventive and corrective service.

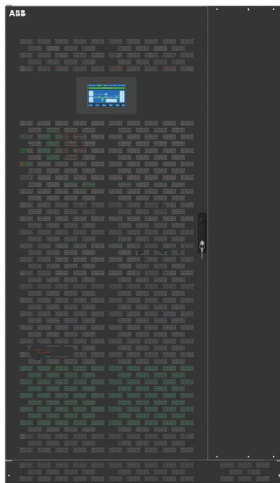


# ABB's TLE Series UPS UL 160–1000kW

## Delivering top efficiency with innovative technology

ABB's TLE Series UPS is one of the most efficient and reliable three-phase UPS systems on the market, providing excellent efficiency, output performance and critical power protection for data centers and many other applications. TLE Series UPS solutions are optimized to provide high efficiency under part-load conditions.

This UPS ensures low current total harmonic distortion (THDi), ideal output voltage regulation and excellent dynamic response. These attributes help customers cut operational costs while implementing an environmentally friendly solution.



**Efficiency of up to 96.8% in VFI mode and up to 99% in eBoost mode**, reducing operational costs and minimizing energy losses



**RPA for reliability, redundancy and scalability**, offering up to six UPSs in parallel and power up to 6MW



**Intelligent energy management integrated operating mode maximizes** efficiency at partial load by dynamically configuring the parallel UPS modules



**Variety of options for energy backup available**, including lithium-ion batteries

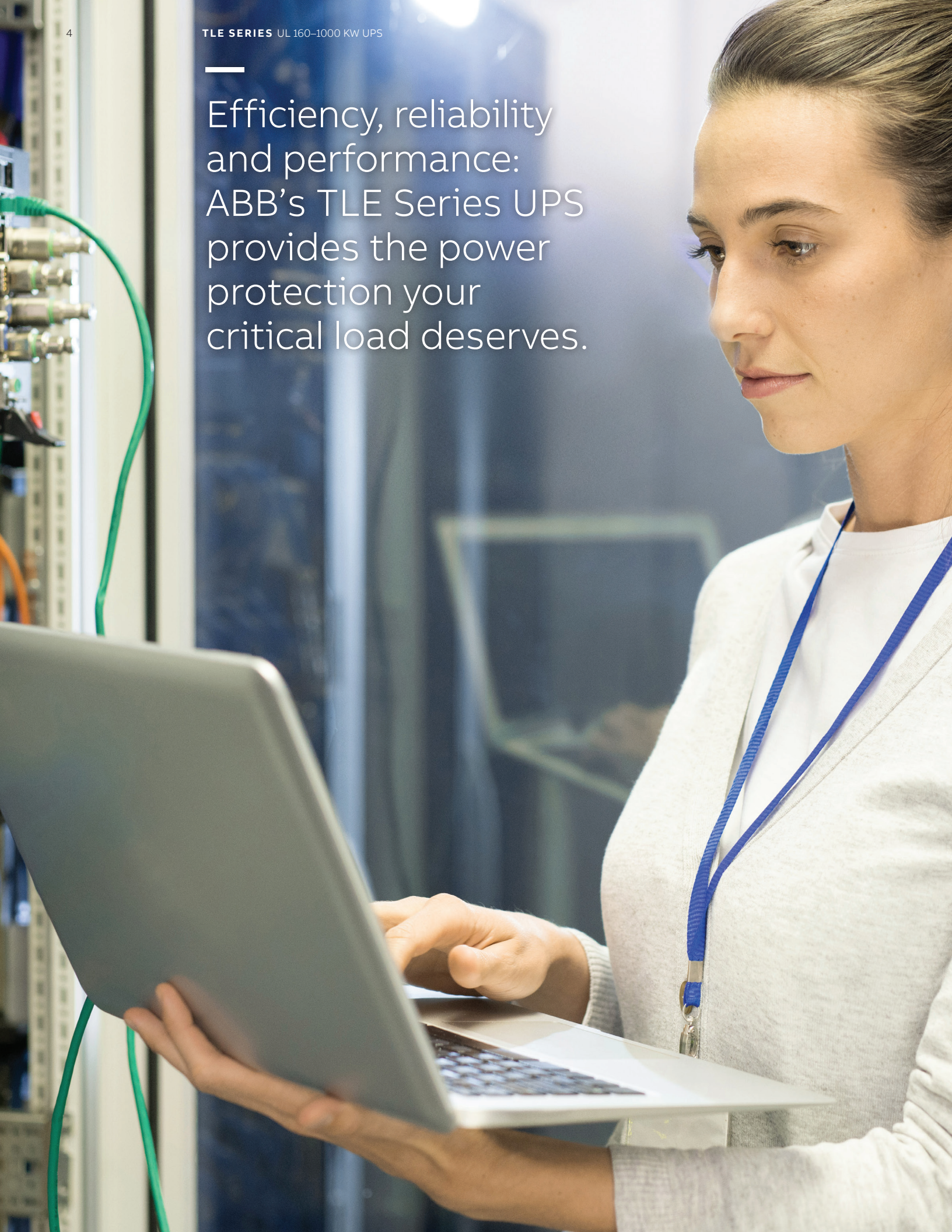


**Advanced control, monitoring and diagnostic capability**, ensuring maximum performance of the UPS



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Efficiency, reliability  
and performance:  
ABB's TLE Series UPS  
provides the power  
protection your  
critical load deserves.

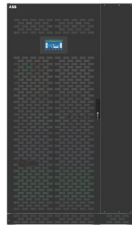




# TLE Series

## Available Models

160kW  
200kW  
225kW  
250kW



43" W

400kW  
500kW



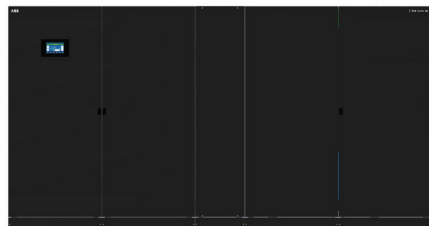
67" W

750kW



102" W

1000kW



130" W



### Key features

- eBoost, lithium batteries and RPA with intelligent energy management™ (IEM) further improve efficiency
- Input from mains conditioned to a sinusoid with 0.99 input power factor and <3%TH Di
- Double conversion efficiency up to 96.8%
- Output power factor: 1
- True front access design
- Compact footprint
- Intuitive user interface
- Extremely low output voltage distortion
- Superior battery management

# Input performance

## Clean input performance

The TLE Series IGBT-based rectifier and innovative control algorithm ensure an input THDi of less than 3% and allow a pure sinusoid to be drawn from the mains. This arrangement also provides UPS input power factor of 0.99.

### Advantages

- Reduction in the size of upfront equipment eg, emergency generators, cabling, and circuit breakers
- No disturbance to nearby equipment; eliminates perturbation and outages on downstream electrical equipment, avoiding also any investigation and analysis costs arising from malfunction

## Programmable soft start

The programmable soft start allows the rectifier to ramp up in a programmable period (0–15 s), thus eliminating inrush current. This feature reduces the need to oversize the input power system (gensets, feeder cables and overcurrent devices).

## Generator compatibility

User-programmable features such as slew rate, phase angle rate-of-change and voltage rate-of-change allow the UPS to sync to a genset quickly during emergency back-up. ABB's input filter also has user-programmable features that ensure quick and continuous synchronization to generator voltage.





# Output performance

01 TLE Series  
power capability

## THDu

A distorted output voltage waveform affects the proper functioning of the load's equipment. The TLE Series has very low output voltage THD, even with 100% unbalanced or 100% nonlinear loads connected.

## TLE Series power capability

- With unity output power factor, the TLE Series provides more output power. The output power factor diagram is symmetrical with respect to zero – no derating with any load.
- Suitable for modern power supply application with unity or capacitive power factor, crest factor up to 3:1

## Transient response

Transient response is very fast due to control algorithms that ensure very high dynamic response. This reduces the need to oversize the UPS for pulse-load applications.

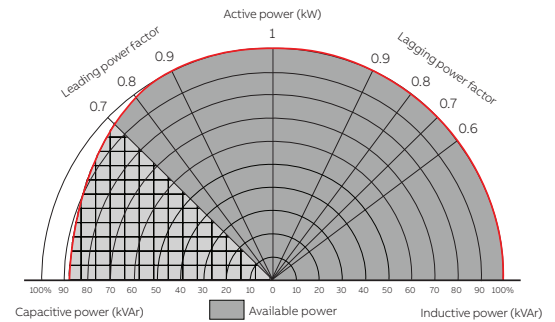
## Overload capabilities

The TLE Series UPS has a robust inverter capable of delivering 150% overload for 30 secs and 125% overload for 1 min, thus ensuring power protection continuity for applications requiring start-up overcurrent and for temporary peak loads.

## Short-circuit capability

The TLE Series inverter supplies 2.2 (for 100 ms) times the nominal current for ph-ph and ph-N/PE short circuits, respectively, ensuring the proper selectivity of the protection devices (fuses and breakers).

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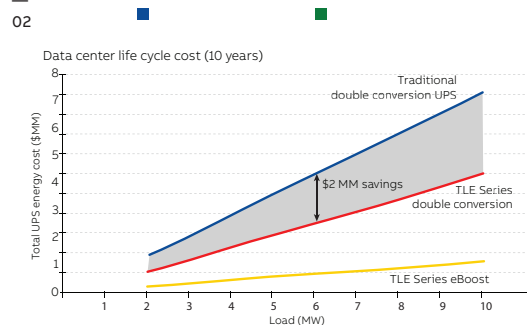
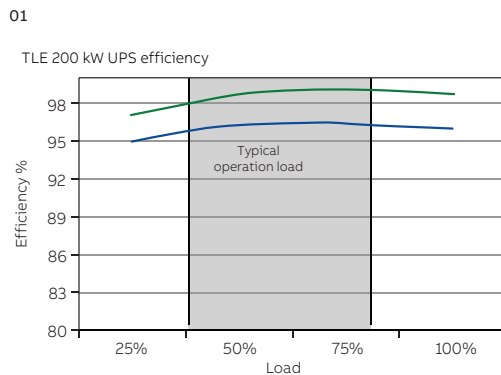
# Ultrahigh efficiency mode eBoost

01 TLE 200 kW UPS efficiency curve during load operation

02 eBoost savings

03 Reducing energy consumption

04 eBoost performance



## How it works

In the TLE Series UPS, the inverter output filter is energized during eBoost operation and can, therefore, provide some degree of current conditioning.

- The inverter filter capacitance may provide displacement power factor correction for inductive (lagging power factor) loads.
- The effectiveness of the power conditioning offered by the inverter output filter is magnified by the bypass series choke. On average, neutral current injected in the upstream power system is reduced to less than half in the downstream load neutral current.

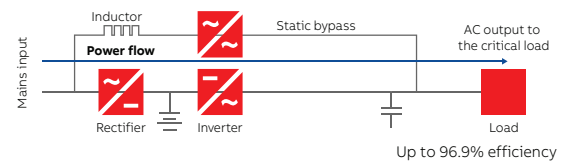
## Energy efficiency is our focus

eBoost – available on 160–1000 kW models – provides considerable additional energy cost savings over the lifetime of the UPS. The savings become particularly significant for large energy users, such as data centers. With eBoost, organizations can reduce energy costs without sacrificing system reliability.

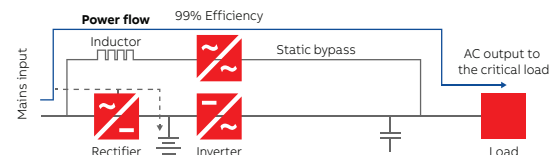
- e = high efficiency, up to 99%
- Boost = fast transfer to inverter: < 2 ms
- Input voltage range:  $\pm 10\%$
- Input frequency range:  $\pm 2\%$
- Compliant with ITI (CBEMA) curve during transient events
- Patented power conditioning/filtering design via bypass inductor and output transformer/capacitor while in eBoost mode
- Battery trickle charge in eBoost operating mode

03

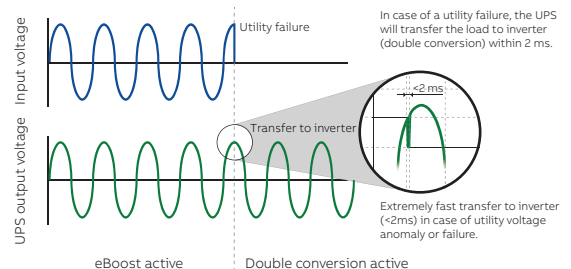
TLE double conversion (VFI) – 3 level converters



TLE eBoost (VFD)



04





# Redundant parallel architecture (RPA)

—  
01 Standard RPA  
configuration: true  
redundancy with  
distributed control  
and bypass

ABB's RPA is a unique technology that allows a UPS to run in a parallel arrangement and with true redundancy by eliminating any single point of failure. RPA provides a scalable paralleling approach that reduces operating footprint and increases system reliability by eliminating the need for external paralleling equipment and cabinets (centralized bypass and master control).

One UPS in the system intelligently takes the leadership role, while the other UPSs have access to all control parameters. If one UPS fails to operate, the load is automatically redistributed among the others. If the lead UPS fails to operate, then another UPS automatically takes on the leadership role. RPA advantages are:

## No single points of failure

The RPA system provides complete redundancy of all critical components and allows paralleling of up to six units for increased load capacity or redundancy.

## Bypass inductor design

Ensures excellent output voltage regulation between paralleled modules and assists bypass line conditioning (eBoost only). Bypass inductor design and RPA Cable Saver – which increases cable length variation allowances between modules – is available for all TLE units.

## Distributed control logic

Each module in an RPA system has its own operational controller. Each controller continuously communicates with all others in order to manage the entire system.

## Redundant communication

Redundant high-speed bus and control electronics provide high system reliability.

## Online maintenance

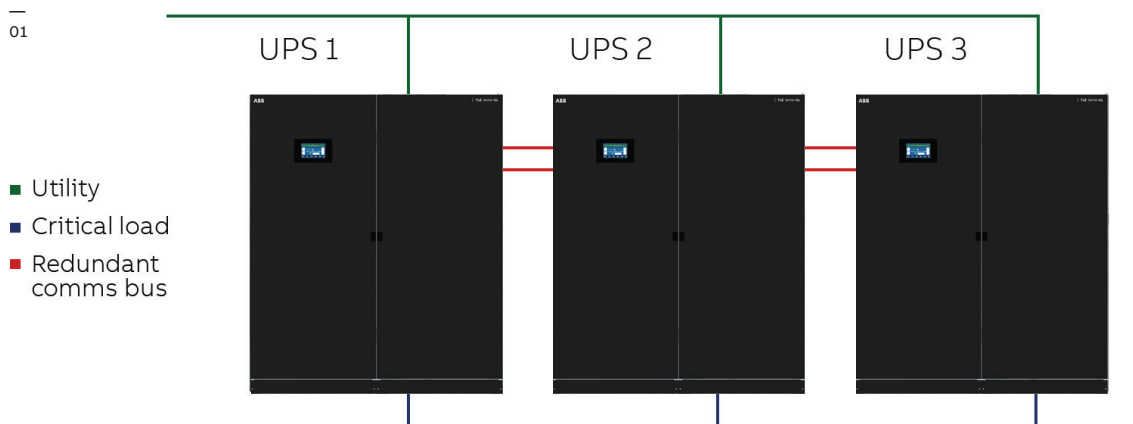
N+1 configuration allows maintenance on any single module in the system while other modules provide online protection with battery backup.

## Sequential soft start

Sequential soft start of each module reduces the instantaneous load on input feeders during mains recovery. This feature means the generator rating can be lower and cables and fuses will be subject to less thermal stress.

## Smaller footprint

RPA eliminates centralized control and the external static bypass cabinet.



# Further product features



## Variety of options for energy backup, including lithium-ion batteries

The TLE Series can be installed with a variety of backup energy options. The entire product line is compatible with lithium-ion batteries – a good option for those who look for further space savings without compromise in backup time.



## Remote monitoring and diagnostic solution (iUPSGuard)

By accessing the latest site information via the Web and alerting by email or SMS when appropriate, this feature enables the user to make timely decisions should critical conditions change. With comprehensive data collection and analysis, iUPSGuard improves diagnostics capability and reduces response time.

- 24/7 remote access to your UPS data using a standard Web browser
- Automatic alerting in case of an event direct and immediately to your cell phone or email
- Regular operational reports with proactive information on critical data
- Preventative information using PMAD (preventative maintenance and advanced diagnostics) feature
- Possibility to reduce intervention and onsite work



## Superior battery management (SBM)

Every TLE UPS incorporates the SBM feature as standard. SBM can be configured to periodically test the battery system and calculate true remaining battery runtime, taking into account measured values for temperature and load. SBM works with all battery types.



## Improved diagnostic and reliability with DSP control

Every TLE Series UPS incorporates advanced diagnostic capabilities with the FLEX DSP control board, which provides high-resolution waveform capture, diagnostics and trend analysis. The TLE Series is also equipped with special hardware and monitoring capability for limited-life components like fans and capacitors.

- Waveform capture capability
- Fan failure detection
- Component lifetime counters (fan and capacitors)
- AC capacitor health monitoring
- IGBT status diagnostic

Improved reliability and availability:

- Dedicated supply for bypass logic
- Dedicated supply for connectivity channels
- Redundant logic for emergency bypass activation
- Mainboard integrated RPA control: RPA board itself contains only interface hardware



## Three-level technology for high efficiency

The TLE Series UPS uses a three-level technology with an advanced neutral-point-clamped topology implemented with true reverse-blocking IGBTs. The result is reduced switching and filter losses compared with two-level technology. Combined with optimized magnetics, the net result is a 96.8% efficiency in double conversion mode at half load. Also, the high level of integration and the optimized power layout result in clean commutations with no overvoltages, which translates into reduced component stress and increased reliability.



# TLE Series

## Technical specification

Power Rating**								
Output Power Rating (kVA)	160	200	225	250	400	500	750	1000
Ouput Power Rating (kW)	160	200	225	250	400	500	750	1000
Energy Usage								
eBoost Mode Efficiency at 50% Load	98.2%	98.3%	98.2%	98.3%	98.2%	98.3%	98.2%	98.4%
eBoost Mode Efficiency at 100% Load	98.6%	98.8%	98.6%	98.8%	98.7%	98.8%	98.8%	98.9%
Dbl Conv Mode Efficiency at 50% Load	96.3%	96.5%	96.3%	96.5%	96.2%	96.4%	96.3%	96.4%
Dbl Conv Mode Efficiency at 100% Load	95.8%	96.0%	95.8%	96.0%	96.2%	96.3%	96.2%	96.2%
Physicals								
Dimensions, w x d x h (in.)	43 X 34 X 75	43 X 34 X 75	43 X 34 X 75	43 X 34 X 75	67 X 34 X 75	67 X 34 X 75	102x34x75*	130x34x75*
Weight, module only (lbs.)	1,433	1,433	1,433	1,433	2,314	2,314	4,409	5,510
Input								
Voltage	480V 3W or 4W + gnd							
Topology	IGBT Rectifier							
Single or Dual Input Capability	Field selectable							
Voltage Range (w/o battery discharge)	-15% to +15%							
Power Factor (lagging)	0.99							
CurrentTHD	< 5.0%							
Frequency	60 Hz +/- 10%							
Output								
Voltage	480/277V 3W or 4W + gnd							
Topology	PWM 3-Level IGBT Inverter							
Frequency	60 Hz +/- 10%							
Crest Factor	3:1							
Static Voltage Regulation	+/- 1%							
100% Step Load Voltage Regulation	+/- 3%							
100% Linear Load Voltage Distortion	<3.0% THD maximum							
100% Non-Linear Load Voltage Distortion	<5.0% THD maximum							
eBoost Transfer Time	< 2msec transfer to Inverter, within ITI/CBEMA voltage compliance curve							
Overload Capability / Inverter	125% / 1 min ; 150% / 30 sec							
Overload Capability / Static Bypass	110% continuous; 150% for 1 minute							
Battery Plant								
Compatible Technologies	VRLA, Wet Cell, NiCad, Lithium Ion, and Flywheel							
Float Voltage	540 VDC, 240 cell system							
RechargeT ime	10X discharge time (at 30 min. battery runtime)							
General								
Ambient operating temperature	UPS Module: 32–104°F (0–40°C)							
Humidity	0–95% non-condensing							
Audible noise	160–500kVA: 75 db(A) at 5 ft. 625–1000kVA: 78 db(A) at 5 ft.							
Audible noise (eBoost mode)	160–500kVA: 66 db(A) at 5 ft. 625–1000kVA: 68 db(A) at 5 ft.							
Listings	ETL as tested to UL1778							
Seismic	All kVA: IBC 2015, ASCE, and OSHPD up to 500kW							
Enclosure	IP20 and NEMA PE-1							
EMC/EMI/RFI	IEC/EN 62040-2/EN50091-2/IEEE C62.41 – Recommended practice for surge withstand ability							
Communication/ Connectivity	RS232, programmable contacts, programmable relays, iUPSGuard, optional SNMP and Modbus							
Color	RAL 9005 Black							
Warranty	12 months after startup or 18 months after shipment (whichever first). Extended warranties available.							



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