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THREE-PHASE STANDALONE UPS SYSTEM

## **TLE Series IEC 200 - 400 kW UPS**

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



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

## **ABB's TLE Series UPS 200 - 400 kW**

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 200 - 400 kW

## 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 96.6 percent in VFI mode and up to 98.3 percent 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 2.4 MW



**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

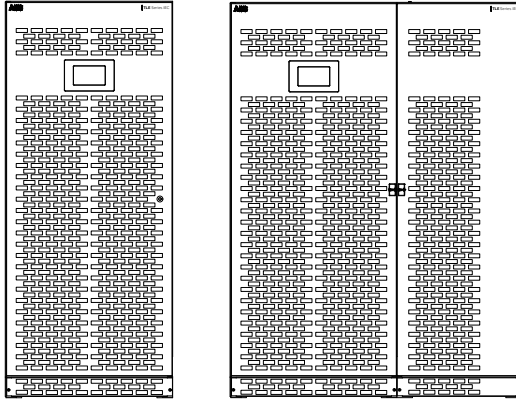
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Efficiency, reliability and performance:  
ABB's TLE Series UPS provides  
the power protection your  
critical load deserves.



# TLE Series

## Available models



Cabinet type	200 kW	400 kW
Dimensions w x h x d (mm)	820 x 1905 x 865	1420 x 1905 x 865
Weight in kg (without battery)	500	980

### 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 percent THDi
- Double conversion efficiency up to 96.6 percent
- Output power factor: 1
- True front access design
- Compact footprint
- Intuitive user interface
- Extremely low output voltage distortion
- Superior battery management

# Input performance

01 TLE Series  
power capability

## Clean input performance

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

### Advantages

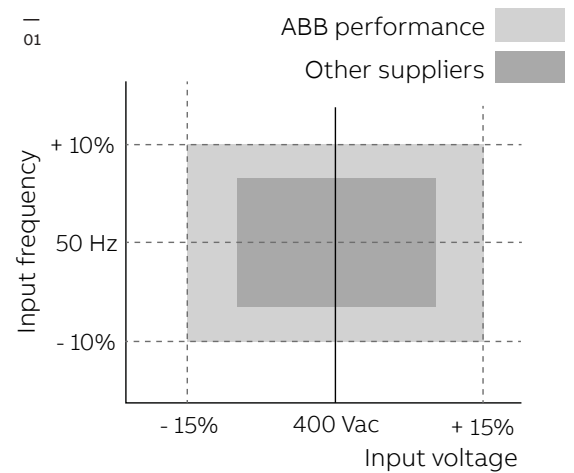
- Reduction in the size of upfront equipment eg, emergency generators, cabling, and circuit breakers
- No disturbance to nearby equipment; eliminates perturbation and outages on downstream electrical equipment, avoiding also any investigation and analysis costs arising from malfunction

## 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 percent unbalanced or 100 percent 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

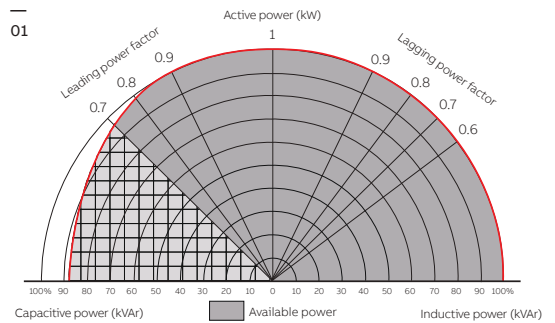
Transient response is very fast due to control algorithms that ensure very high dynamic response. This reduces the need to oversize the UPS for pulse-load applications.

### Overload capabilities

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

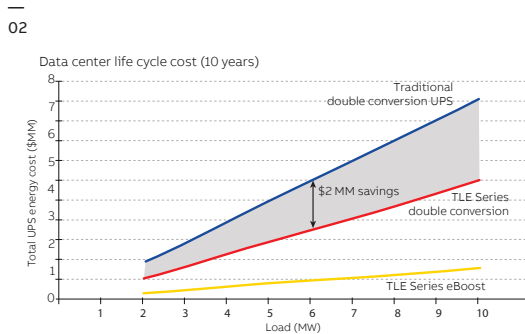
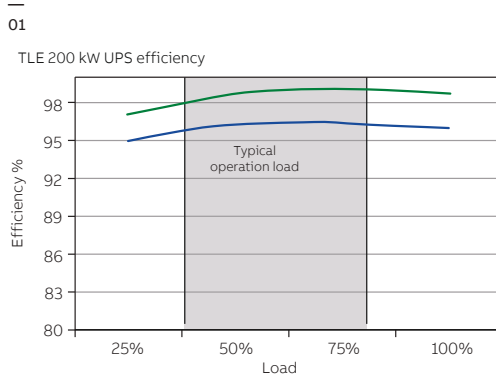
### Short-circuit capability

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).



# 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.

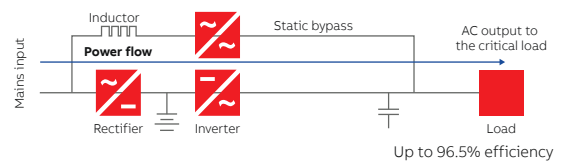
- The inverter filter capacitance may provide displacement power factor correction for inductive (lagging power factor) loads.
- The effectiveness of the power conditioning offered by the inverter output filter is magnified by the bypass series choke. On average, neutral current injected in the upstream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

## Energy efficiency is our focus

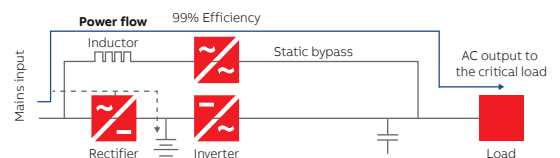
eBoost provides considerable additional energy cost savings over the lifetime of the UPS. The savings become particularly significant for large energy users, such as data centers. With eBoost, organizations can reduce energy costs without sacrificing system reliability.

- e = high efficiency, up to 99 percent
- Boost = fast transfer to inverter: < 2 ms
- Input voltage range: ± 10 percent
- Input frequency range: ± 2 percent
- 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

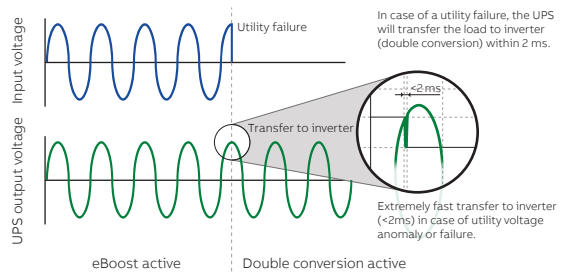
03 TLE double conversion (VFI) - 3 level converters



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

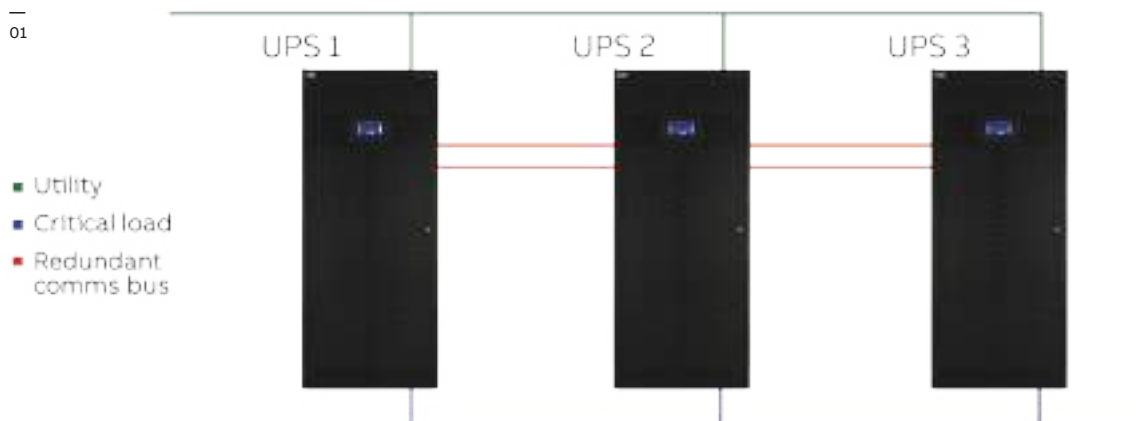
N+1 configuration allows maintenance on any single module in the system while other modules provide online protection with battery backup.

#### 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 96.6 percent efficiency in double conversion mode. 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

<b>General data</b>		
System power range	200 kW	400 kW
Active power / frame	200 kW	400 kW
Output power factor	<b>1.0</b>	
Topology	Online double conversion	
UPS type	Standalone tower	
Parallel configuration	Up to 6 units in parallel with redundant parallel architecture (RPA)	
<b>Input</b>		
Nominal input voltage	3 x 380/400/415 V + N	
Voltage tolerance	340-460 V	
Input distortion THDi	<3%	
Frequency	50/60 Hz	
Frequency range	45-66 Hz	
Power factor	>0.99	
Walk-in /soft start	Yes	
<b>Output</b>		
Rated output voltage	3 x 380/400/415 V + N	
Voltage tolerance	+/-1% static, +/-3% dynamic, +/-3% unbalanced load	
Voltage distortion THDU	<2.5% linear load, <5% nonlinear load (EN 62040)	
Frequency	50/60 Hz	
Overload capability (at 25 C environmental temperature)	150% 30 s, 125% 1 min, 100% 10 min, 105% continuous	
Output short-circuit capability	2.2*In (Ph-N/PE and Ph-Ph)	
Crest factor	>3:1	
<b>Efficiency</b>		
Overall efficiency (VFI)	Up to 96.6%	Up to 96.6%
In eco-mode configuration (eBoost*)	Up to 98.3%	Up to 98.3%
<b>Environment</b>		
Storage temperature	UPS: -25° C +55° C	
Operating temperature	0-40° C	
Humidity	Max. 95% (non-condensing)	
Altitude configuration	Up to 1000 m with no de-rating, at 1500 m:-2.5%/ 2000 m:-5%/ 2500 m:-7.5%/ 3000 m:-10% (EN/IEC 62040-3)	
<b>Communications</b>		
HMI	Multilingual graphic display (LCD)	
Relay contractors	6 voltage-free contacts for 27 programmable alarms	
Input signals	EPO, Gen-ON (emergency power supply ON, n/o contact), 1 auxiliary signal (settable functionality)	
Communication ports	RS232, SNMP (Modbus IP, RS232, RS485 & BacNet IP)	
<b>Electrical / mechanical</b>		
Degree of protection	IP20	
Color	RAL 9005 (black)	
Cable entry	Top/bottom (top optional only for 200 kW)	
Back-feed protection	Built-in as standard	
Serviceability	Fully front serviceable	
Ventilation	From front to top	
<b>Batteries</b>		
Type	VRLA batteries, vented lead-acid batteries, wet batteries, NiCd, flywheel, Li-Ion	
DC floating voltage	545-600 V	
<b>Standards</b>		
Safety	IEC / EN 62040-1	
Electromagnetic compatibility (EMC)	IEC / EN 62040-2	
Performance	IEC / EN 62040-3	
Product certification	CE marking	
Manufacturing	ISO 9001	
<b>Weight, dimensions</b>		
Weight (kg)	500	980
Dimensions w x h x d (mm)	820 x 1905 x 865	1420 x 1905 x 865

\* Optional feature for all available models



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