

TLE Series UPS 300/400/500 kW with eBoost Technology



The new TLE Series Uninterruptible Power Supply (UPS) is a three-phase high power product with best-in-class multi-mode efficiency for global critical power needs. The TLE platform establishes GE UPS technology leadership in high power applications with industry leading differentiation in efficiency, output power capacity and footprint.

GE's TLE Series UPS is one of the most energy efficient multi-mode UPS in the industry, and provides world-class energy efficiency across the operating load range. The TLE Series delivers efficiency up to 97% in double conversion mode and 99% in eBoost operating mode. This system efficiency substantially reduces operating and cooling costs thus providing a reduced cost of ownership and improved power usage effectiveness (PUE) compared to conventional UPS.

Features and Benefits

Technology at Its Best

- Highly reliable and efficient tri-level conversion
- Automatic or manual multi-mode operation

"Best of Both Worlds" Operating Efficiency

- Up to 97% efficiency in premium protection mode (double conversion)
- Up to 99% efficiency in premium energy save mode (eBoost)

Electrical Environment Optimization

- Unity (1) Output Power Factor
- High (0.99) Input Power Factor
- Less than 5% Input Current Harmonic Distortion

Technology at Its Best

- Highly reliable and efficient tri-level conversion
- Automatic or manual multi-mode operation

Key Applications/Verticals

- Data Centers
- Healthcare Facilities
- Financial Institutions
- Colleges/Universities

- Multi-Mode Efficiency
- Superior Input, Output & Physical Characteristics
- Advanced User Interface
- UPS RPA Paralleling Architecture
- Reliability, Diagnostic & Monitoring Enhancements
- GE Capital Retrofit Program



TLE Series UPS 300/400/500 Technical Datasheet

| GENERAL DATA | | | | | | |
|---|--|---|---------------------------|---------------------|---------------------|---------------------|
| Topology | | True double conversion (VFI) Transformerless | | | | |
| Nominal output power at PF = 0.7 lag to 0.9 leading | | kVA | 300kVA / 400kVA / 500kVA | | | |
| Nominal output power at PF = 1 | | kW | 300 kW / 400 kW / 500 kW | | | |
| System Efficiency in Double Conversion operating mode @1 PF load, nominal voltage/frequency, energy storage disconnected | | 25% load | 50% load | 75% load | 100% load | |
| 300kW | | 94.3% | 96.5% | 96.8% | 96.9% | |
| 400kW | | 95.8% | 96.8% | 96.8% | 96.7% | |
| 500kW | | 96.0% | 96.7% | 96.7% | 96.6% | |
| System Efficiency in eBoost Operating mode @1 PF load, nominal voltage/frequency, energy storage disconnected | | 25% load | 50% load | 75% load | 100% load | |
| 300kW | | 96.3% | 97.6% | 98.0% | 98.1% | |
| 400kW | | 97.0% | 98.2% | 98.6% | 98.6% | |
| 500kW | | 97.2% | 98.3% | 98.7% | 98.8% | |
| Heat rejection in Double Conversion operating mode @1 PF load, nominal voltage/frequency, energy storage disconnected | | 25% load | 50% load | 75% load | 100% load | |
| 300kW | | BTU/hr | 14603 | 17847 | 24326 | 31675 |
| | | kW | 4.3 | 5.2 | 7.1 | 9.3 |
| 400kW | | BTU/hr | 14502 | 22038 | 32405 | 44642 |
| | | kW | 4.2 | 6.5 | 9.5 | 13.1 |
| 500kW | | BTU/hr | 16934 | 27941 | 41987 | 58703 |
| | | kW | 5.0 | 8.2 | 12.3 | 17.2 |
| Heat rejection in eBoost operating mode @1 PF load, nominal voltage/frequency, energy storage disconnected | | 25% load | 50% load | 75% load | 100% load | |
| 300kW | | BTU/hr | 9471 | 12287 | 15358 | 19454 |
| | | kW | 2.8 | 3.6 | 4.5 | 5.7 |
| 400kW | | BTU/hr | 10553 | 12509 | 14534 | 17977 |
| | | kW | 3.1 | 3.7 | 4.3 | 5.3 |
| 500kW | | BTU/hr | 12287 | 14752 | 16853 | 20722 |
| | | kW | 3.6 | 4.3 | 4.9 | 6.1 |
| Max Cooling Air (77°F - 86°F / 25°C - 30°C) (300/400/500kVA) | | 2710/3294 CFM | | | | |
| Audible noise level (at 5 ft./1.52Mts) | | | | | | |
| Double Conversion Mode | | 75 dB(A) | | | | |
| eBoost Mode | | 66 dB(A) | | | | |
| Operating temperature range | | | | | | |
| UPS | | 32°F - 104°F (0°C - 40°C) | | | | |
| Battery | | 68°F - 77°F (20°C - 25°C) (Note: Higher temperatures shorten battery life) | | | | |
| Storage temperature range | | | | | | |
| UPS | | 5°F - 122°F (-15°C to +50°C) | | | | |
| Battery | | 32°F - 104°F (0°C - 40°C) | | | | |
| (VRLA) | | Storage time is 3 months at 77°F (25°C) (Note: Higher temperatures shorten battery life) | | | | |
| Relative Humidity | | 0-95%, non-condensing | | | | |
| Maximum Altitude | | ft (M) | 3281 / 1000 (no derating) | | | |
| | | ft (M) | 4921ft (1500Mts) | 6562ft (2000Mts) | 8202ft (2500Mts) | 9843ft (3000Mts) |
| | | Derating | -2.5% | -5.0% | -7.5% | -10.0% |
| Enclosure | | | | | | |
| Type | | Indoor (IP20) and NEMA PE 1 | | | | |
| Safety | | Internal dead front construction | | | | |
| Cooling | | Forced Air | | | | |
| Color | | Black (RAL 9005) | | | | |

| GENERAL DATA (continued) | |
|-------------------------------------|---|
| Installation | |
| Rigging | Suitable for handling by forklift |
| Mounting | Floor mounting holes provided |
| Installation and maintenance access | Front access required for normal maintenance |
| Conduit Entry | Top and Bottom standard |
| Standards | ETL Listed to UL 1778, ANSI C62.41b |
| Electrostatic discharge immunity | 4kV contact / 8kV air discharge |
| Configuration | |
| Standard | Single Module System |
| Optional | Redundant Parallel Architecture (RPA) - up to 6 modules may be paralleled in any combination for redundancy or capacity |
| Fault current rating | UPS is designed for installation in an electrical system up to 65kA |

| RECTIFIER | |
|-----------------------------|--|
| Configuration | Three phases rectifier bridge with three level IGBT technology |
| Input | |
| Voltage | 480VAC, 3-phase, 4 wire + ground OR 3 wire + ground (+/- 15% without battery discharge) |
| Frequency | 60Hz, +/-10% (54-66Hz) |
| Harmonic Current Distortion | <5% |
| Power Factor (Typical) | 0.99 lagging |
| Inrush current | Limited by soft-start circuit |
| Power walk-in | 30 seconds (Adjustable) |
| Output Voltage Tolerance | +/- 1% |
| DC ripple voltage | +/- 1% |
| DC ripple current | Max. 5% of battery capacity expressed in amps |

| UPS RATING vs. CURRENT LIMITS | | 300 kVA/kW | 400 kVA/kW | 500 kVA/kW |
|--------------------------------|------|------------|------------|------------|
| Nominal input (100% load) | Amps | 376.4 | 502.4 | 628.0 |
| (1 PF load, fully chrg'd bat.) | kVA | 313.0 | 417.7 | 522.1 |
| | kW | 305.8 | 413.5 | 516.9 |
| Maximum input (100% load) | Amps | 376.4 | 557.0 | 682.6 |
| (1 PF load, max. chrg current) | kVA | 358.3 | 463.1 | 567.5 |
| | kW | 354.7 | 458.5 | 561.8 |
| Max. charge current | Amps | 9 | 90 | 90 |

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| BATTERY | | | | |
|--|---|------------|------------|------------|
| Battery compatibility | Lead-acid or NiCd, VRLA or flooded | | | |
| Number of cells | 240 (lead-acid) | | | |
| Float voltage at 68°F (20°C) | 540VDC | | | |
| Minimum discharge voltage | 396VDC (adjustable) | | | |
| Recharge time | 10 times the discharge time | | | |
| Battery ground fault detection | Standard | | | |
| Automatic and manual battery test | Standard | | | |
| Common battery in parallel system | Up to 3 units | | | |
| | | | | |
| UPS RATING | | 300 kVA/kW | 400 kVA/kW | 500 kVA/kW |
| @100% load, 1 PF | kWB | 312 | 416 | 520 |
| Maximum Discharge Current (1.65V cell) | Amps | 788 | 1051 | 1313 |
| | | | | |
| INVERTER | | | | |
| Nominal output voltage | 480VAC, 3-phase, 4 wire + ground OR 3 wire + ground | | | |
| Inverter bridge | Three phases inverter bridge with three level IGBT technology | | | |
| Output waveform | True sine wave | | | |
| Output voltage tolerance | | | | |
| Static | +/- 1% | | | |
| Load step 0% - 100% - 0% | +/- 3%, recovering to within +/- 1% in 1 cycle | | | |
| Load step 0% - 50% - 0% | +/-2%, recovering to within +/- 1% in 1 cycle | | | |
| 100% unbalanced load (Ph-N) | +/- 3% | | | |
| Output voltage distortion | | | | |
| 100% linear load | 3% THD maximum | | | |
| 100% non-linear load (per IEC 62040) | 5% THD maximum | | | |
| Crest factor capability | < 3:1 | | | |
| Output neutral rating | 200% | | | |
| Phase displacement | | | | |
| 100% balanced load | 120° +/- 1% | | | |
| 100% unbalanced load | 120° +/- 2% | | | |
| Output frequency | | | | |
| Free running | 60Hz, +/- 0.1% | | | |
| Synchronized with utility | +/- 4% (adjustable from 57.6Hz to 62.4Hz) | | | |
| Overload capability (on inverter) | 125% at 1 PF for 1 minutes | | | |
| | 150% at 1 PF for 30 seconds | | | |
| Short circuit capability (on inverter) | 220% for 100 ms, electronically limited | | | |
| | | | | |
| UPS RATING | | 300 kVA/kW | 400 kVA/kW | 500 kVA/kW |
| Maximum Output Current @ 1 PF | Amps | 360.8 | 481.1 | 601.4 |

| STATIC BYPASS | | |
|--|--|--------------------|
| Input configuration | Single input (standard) or dual input (optional) | |
| Primary components | Fully rated continuous duty static switch | |
| | Back feed protection + Semiconductor fuse for clearing fault currents | |
| Transfer limits | +/- 10% of nominal output voltage (adjustable) | |
| Overload capability (on bypass) | 110% continuous | |
| | 150% for 1 minute | |
| Short circuit capability (on bypass) | 1000% for 1/2 cycle (non-repetitive) | |
| eBoost™ OPERATING MODE | | |
| Input wiring configuration | 480VAC, 3-phase, 4 wire + ground OR 3 wire + ground | |
| Output waveform | Continuously monitored | |
| Transfer time to Inverter | <2ms (typical) | |
| Transfer limits | | |
| Steady-state RMS tolerance | +/-20 Vrms (adjustable) | |
| Instantaneous voltage distortion (with respect to Normal Sine wave) | Magnitude | +/-75Vp |
| | Duration | 500µs (adjustable) |
| Steady-state frequency tolerance | +/-3 Hz | |
| Instantaneous phase shift | 0.15 radians (8.5 Deg) | |
| EXTERNAL INTERFACE | | |
| Alarm contacts (voltage-free) | | |
| Standard | 6 user defined contacts (form 'C') (1A / 24V DC) | |
| Optional | 12 user defined contacts (form 'C') (1A / 24V DC) | |
| | (23 selectable signals include aux. Inputs 1 & 2) | |
| Communication | RS-232 / SNMP / MODBUS | |
| Input signals | Emergency Power Off (user supplied N.C. contact) | |
| | Aux. input 1 * (default = On Generator) | |
| | Aux. input 2 * (configurable) | |
| | * Status displayed on LCD panel | |
| Diagnostics | Internal Waveform Capture. Input and output w/pre and post event data (Field Service Only) | |

FRONT PANEL CONTROLS, SIGNALS & ALARMS

Touch Screen Graphic Display



| | | |
|-------------------------------|---|--------------|
| Mimic Diagram | Represents operational status of the UPS on Home Page of LCD | |
| Operation LED | Visual indicator when load is on inverter OR load is on bypass | |
| | BLINK during service check | |
| Alarm LED | Visual indicator and audible signal, activates approx. 3 minutes (adjustable) before complete and automatic load shutdown due to the battery is fully discharged and the load cannot be transferred on utility or Over temperature or overload condition (>125%) and the load cannot be transferred on utility. | |
| Warning LED | Visual indicator and audible signal active when any alarm condition is present | |
| | BLINK when alarm is active and not acknowledged | |
| Load Level / Battery Run Time | Bar graph status indicator on Home Page of LCD | |
| | Load level in %, Battery run time in min. | |
| Multilanguage Graphic LCD | Display of UPS metering functions , event history, configuration of parameters and helps perform critical UPS Operations | |
| | Supports 14 Languages (Chinese, Czech, Dutch, English, Espanola, Francais, German, Italiano, Polish, Portuguese, Russian, Slovensko, Soumi, Swedish) | |
| Push Buttons | Inverter On | Inverter Off |
| | | |

OPTIONAL FEATURES

| | |
|-----------------------------|---|
| RPA | Redundant Parallel Operation |
| eBoost™ (Multi-Mode) | High Efficiency Operating Mode for Single and Multi module applications |
| Dual Input | Integral to UPS cabinet. No additional cabinet required |
| Input/Output Transformers | Available in external cabinets for isolation or voltage transformation |
| External Maintenance Bypass | Available in external or as a part of output switchgear cabinet |
| Protection Software | PC operated remote monitoring, control and diagnostics |
| SNMP Communication | Ethernet interface for network connection |

FRONT PANEL CONTROLS, SIGNALS & ALARMS

400/500 kW Enclosure



| | | | |
|--------------------------|-------------------|-----------------------------------|------------|
| Dimensions (inches / mm) | Width (W) | Depth (D) | Height (H) |
| | 63.78/1620 | 34.06/865 | 75.00/1905 |
| Configuration | Weight (lbs./ Kg) | floor load (lbs./sq ft / Kg/sq m) | |
| | 2756/1250 | 183/892 | |

UPS BLOCK DIAGRAM

| | | |
|--|------------------------|----------------------------|
| | Standard configuration | With separate Bypass Mains |
| 1 Rectifier | | |
| 2 Inverter | | |
| 3 Static Bypass | | |
| 4 Load switch | | |
| 5 Utility | | |
| 6 Load Output | | |
| 7 External Battery | | |
| 8 RPA Cable Saver Inductor | | |
| 9 Booster/Charger | | |
| FB/CB3 Battery Fuses or Circuit Breaker | | |
| F1, F2, F3 AC Input Fuses or Circuit Breaker | | |

With separate Bypass Utility:
connect a single input Neutral to Bypass Utility (inside the UPS, common neutral for Bypass and Rectifier)

