



TLE SERIES UPS

40-150 KVA/KW, 480 VAC Three phase
Highly Efficient and Scalable



TLE UPS Systems - Overview

Introduction

The TLE Series UPS is a robust, high performance 480/277VAC UPS System suitable for a broad range of mission-critical applications including data centers, data closets, healthcare/medical, telecommunications, transportation, commercial buildings, and industrial critical processes.

Design and Performance

The TLE Series UPS uses double conversion technology via a true on-line VFI (voltage frequency independent) design. The IGBT Rectifier provides low input current harmonic distortion and a high input power factor to minimize input feeder sizing. The IGBT Inverter with transformerless output ensures low output voltage distortion and fast transient response to high crest factor loads or step loads.

Multi-Mode Efficiency

The TLE Series UPS can operate up to 98.9% efficiency when utilized in EcoMode operation. EcoMode continuously monitors the output voltage and frequency, and will instantaneously switch to double conversion mode and inverter usage during voltage and/or frequency disturbances to insure compliance with the IT1 (CBEMA) curves for operation on sensitive IT server or other critical loads.

Redundant Parallel Architecture (“RPA”)

Redundant Parallel Architecture can be used on TLE Series UPS for up to six (6) modules, for redundancy or capacity means. The RPA system design eliminates single points of failure by using redundant controls and an integrated bypass static switch in each UPS module. The RPA system allows for flexibility in output paralleling cabinet design and usage, including load growth scalability/expansion capabilities.

Site Services & Remote Monitoring

GE Critical Power Services offers a wide array of site services, including product startup, preventative maintenance and emergency maintenance. GE’s iUPSGuard software allows for remote monitoring of key subsystems within the UPS module and battery, allowing for proactive dispatching and problem resolution when emergency repairs are required.



Illustration picture

TLE UPS Systems - Overview (Cont.)

Features and Benefits

- Transformerless design at 277/480VAC to reduce footprint and weight, yet increase reliability.
- High input power factor and use of a IGBT Rectifier eliminates the use of oversized input feeders, and maximizes standby generator compatibility
- High switching frequency IGBT Inverter provides best-in-class transient response and low output voltage distortion. An output voltage waveform that closely resembles utility power!
- Compact footprint and low audible design, allows for use in most commercial and industrial buildings
- Reliable paralleling of UPS modules via GE's RPA design, which eliminates any and all common mode failure points
- Wide band of acceptable AC input voltage and frequency, that eliminates nuisance transfers to the battery plant, thus maximizing battery jar life
- Internal battery management & monitoring system (SBM) that enhances battery life and reduces cost of operation. Also eliminates need for costly 3rd party bolt-on battery monitoring systems
- Optional maintenance bypass capabilities, via external wrap-around cabinetry
- Optional 208VAC output, via matching stepdown transformer cabinetry
- Optional output distribution cabinet with panelboard or subfeed circuit breakers
- Seismic area capabilities, via seismic restraint hardware and seismic lab testing
- Two Year Parts and Labor Warranty

TLE Series Ease of Installation & Improved Serviceability

Front Access

TLE Series is designed to have front access for all the critical components that reduces mean time to repair (MTTR).

Scalability & Slide Out Construction

The TLE Series UPS scales vertically to up to 150kW, and all sub-assemblies are designed to easily slide out for fast maintenance and service. Now you can replace fans, caps, etc. as needed without having to replace the entire power block.

Improved Diagnostic

TLE Series new diagnostic features allows to store different wave forms and also provides fan failure detection as well as warning on capacitor life that improves UPS availability and enhances preventive maintenance capabilities.

Standard Safety and Maintenance Feature

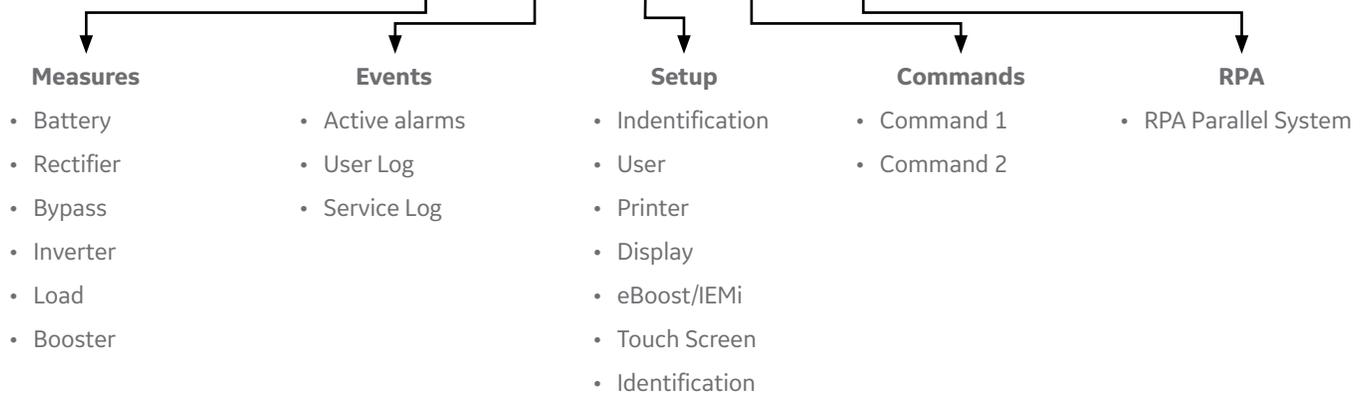
To provide enhanced safety and protection the TLE Series UPS has standard built in back-feed protection.

TLE UPS System - Display & Control Panel Features

Advanced User Interface

The TLE Series UPS is equipped with menu-driven touch screen display panel provides easy to read details on UPS status and metering, parameter settings, UPS configuration. This user-friendly display panel provides:

- Critical measurement of input, output and battery included with mimic diagram
- Quick operational status
- Measurement and operational status of RPA system
- Different access level for user and service
- Multilanguage communication interface supporting: English, German, Italian, Spanish, French, Finnish, Polish, Portuguese, Czech, Slovakian, Chinese, Swedish, Russian and Dutch.



Input Performance

Clean Input Performance

The TLE Series IGBT based rectifier and innovative control algorithm ensures an input Total Harmonic Distortion (THDi) of less than 3% and draws a pure sinusoidal waveform from the mains. This also provides UPS input power factor of 0.99.

Advantages

- Saving in the sizing of upfront equipment e.g. emergency generators, cabling, and circuit breakers
- No disturbances to nearby equipment; eliminate perturbation and outage on upfront electrical equipment, avoiding also any investigation and analysis cost due to malfunction

Programmable Soft Start

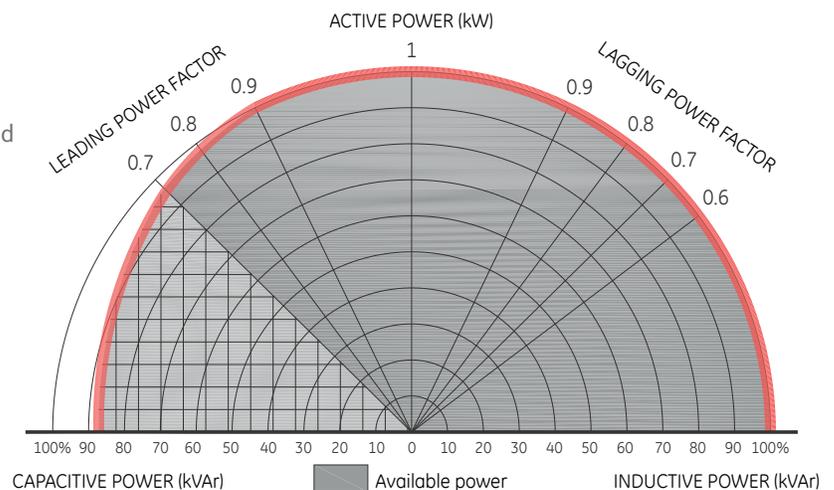
The programmable soft start allows the rectifier to ramp up in a programmable time period thus eliminating in-rush current. This feature reduces the need of oversizing the input power system (gensets, feeder cables, and overcurrent devices).

Generator Compatibility

User-programmable features such as slew rate, phase angle rate-of-change and voltage rate-of-change allow the UPS to quickly sync to a genset during emergency back-up.

TLE Series Power Capability

Unity output power factor, full power for critical load without derating for actual and future IT loads.



Output Performance

Total Harmonic Distortion (THD)

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

Unity Output Power Factor

- TLE Series with unity output power factor provides more real power. kVA equals KW – no derating with any load, see Power Capability diagram below.
- Suitable for modern power supply application with unit or capacitive power factor (e.g. new servers generation), crest factor up to 3:1.

Transient Response

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

Redundant Parallel Architecture (RPA) System Configurations

GE provides RPA, a unique technology that can parallel UPS modules with true redundancy by eliminating any single point of failure. RPA provides a scalable paralleling technique that reduces operating footprint and increases system reliability by eliminating the need for external paralleling equipment and cabinets (centralized bypass and master control).

One of the UPS modules in the system intelligently takes the leadership role, while the other UPS modules 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. GE's RPA technology is implemented by distributing the control electronics within each UPS module in the system.

RPA System Advantages

No Single Points of Failure

The RPA system provides complete redundancy of all critical components, allows paralleling of up to 6 units for increased load capacity or redundancy.

Scalable

The system can be easily expanded for higher capacity and redundancy without any interruption to the critical load or transfer to bypass.

Distributed Control Logic

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

Redundant Communication

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

Online Maintenance

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

Sequential Soft Start

Provides sequential soft start of each module to reduce instantaneous load on input feeders during mains recovery. This helps avoid over-rating of generator and overheating of cable and fuses.

Smaller Footprint

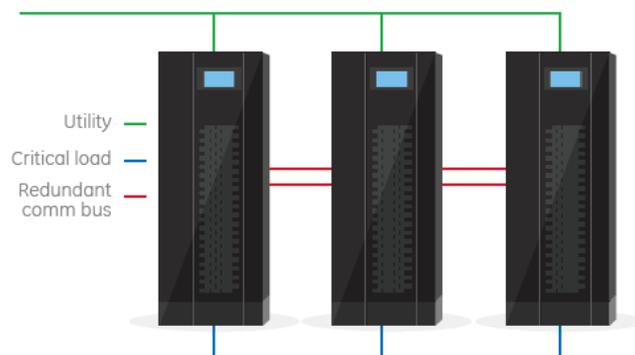
RPA eliminates the centralized control and external static bypass cabinet.

RPA Configuration

Configurable up to 6 units in parallel

- Future expansion
- Safe and reliable power supply
- Redundant Communication Bus
- Easy to install and maintain
- Easy system upgrade/downgrade
- Maintenance operation without load interruption

Standard RPA™ Configuration:
True Redundancy with Distributed Control & Bypass



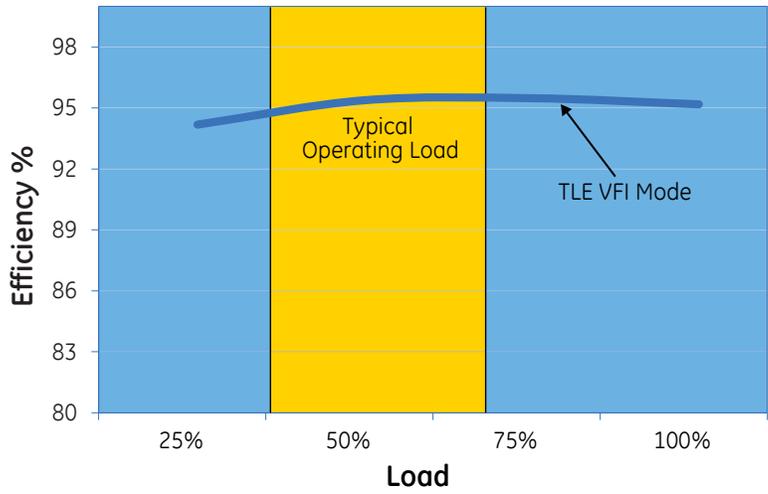
Powering Your Next... is our focus

GE's TLE Series UPS is one of the most energy efficient double-conversion UPS in the industry, and provides world-class energy efficiency across the operating load range. The TLE Series delivers efficiency up to 95.9% in double conversion mode.

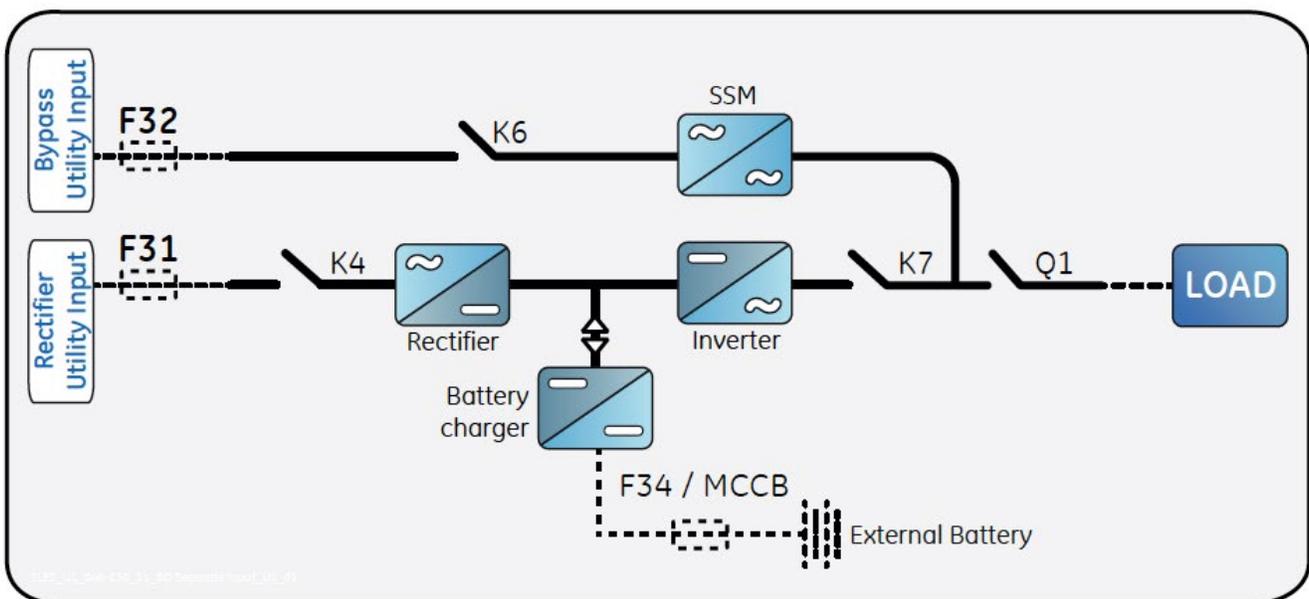
GE's UPS performance is optimized at 50-75% load operation, as this is the most common operating range. The optimization of the TLE Series includes selecting all major power chain components based on maximizing the component efficiency at part load conditions.

TLE Series UPS Provides:

- Substantial reduction in operating cost of UPS
- Reduced energy loss minimizes air conditioning requirement
- Energy savings from reduced cooling



UPS Block Diagram



TLE Series Power Capability

GENERAL DATA	TLE 40 UL S1	TLE 50 UL S1	TLE 80 UL S1	TLE 100 UL S1	TLE 120 UL S1	TLE 150 UL S1
Topology	VFI, double conversion					
Nominal output power	40kW	50kW	80kW	100kW	120kW	150kW
Overall efficiency in VFI mode	Up to 95.9%					
Overall efficiency in SEM mode (Super Eco Mode)	up to 98.9%					
Audible noise level	62 dB(A)					
Operating temperature range	UPS: 32°F to 104°F/ 0°C to 40°C (122°F /50°C subjected to conditions)					
Protection degree	IP 30 (IEC 60529 - ANSI/NEMA 60529)					
Standards	UL 1778, UL marking					
EMC (Electromagnetic Compatibility)	EN/IEC 62040-2					
Electrostatic discharge immunity	4kV contact / 8kV air discharge					
Color	RAL 9005 (Black)					
Service access	Front and top access only					
External cable connections	Bottom at the front of the cabinet or top with lateral sidecar					
Paralleling (RPA version)	Up to 6 units for redundancy or capacity in RPA configuration (option)					

RECTIFIER

Standard input voltage	Nominal: 3 x 480V + N
Rectifier accepted ph-ph voltage range	410V - 550V (wider voltage range subject to de-rated loads)
Input frequency	60 Hz +/-10% (54 ÷ 66 Hz)
Power factor	0.99
Input current THD	<3% at 100%

INVERTER

Nominal output voltage (on site programmable)	3 x 480V + N
Output frequency	60 Hz
Output voltage tolerance: static	+/- 1%
Output voltage tolerance: dynamic (at load step 0 - 100 - 0%)	+/- 3%
- output voltage THD for 100% linear load	<3%
- output voltage THD for 100% non-linear load (EN 62040)	<5%
Output frequency tolerance: free-running	+/- 0.1%
Overload capability (at 25°C ambient temperature)	105% continuous, 110% - 10 minutes, 125% - 1 minute, 150% - 30 seconds

TLE Series Power Capability (Cont.)

BYPASS	
Voltage limits for inverter/ bypass load transfers	+/- 10% (adjustable)
Overload on bypass	198A continuous - 270 for 1 minute - up to 3000A for 10ms, non repetitive
Primary components	Static switch (SCR) on bypass Electromechanic contactors (backfeed protection) on bypass and inverter

INTERFACING	
Standard interfacing features	RS232 serial port, EPO, Customer Interface board, 3-ph SNMP/MODBUS/WEB plug-in Adapter, Black Box for standard intelligent Diagnostics

PHYSICAL DATA			
Weights	849 lbs / 385 Kg	992 lbs / 450 Kg	1147 lbs / 520 Kg
Floor loading	152 lbs/sq.ft / 742 Kg/m ²	178 lbs/sq.ft / 867 Kg/m ²	205 lbs/sq.ft / 1002 Kg/m ²
Dimensions (WxDxH)	23.62 x 34.06 x 64.17 inches / 600 x 865 x 1630 mm		

TLE UPS - Battery Systems

BATTERY	
Battery type	Valve regulated lead-acid (VRLA), NiCad, Lithoum Ion, Wet Cell
DC System	545VDC Float Voltage. 2.27VDC/Cell., 240 Cells

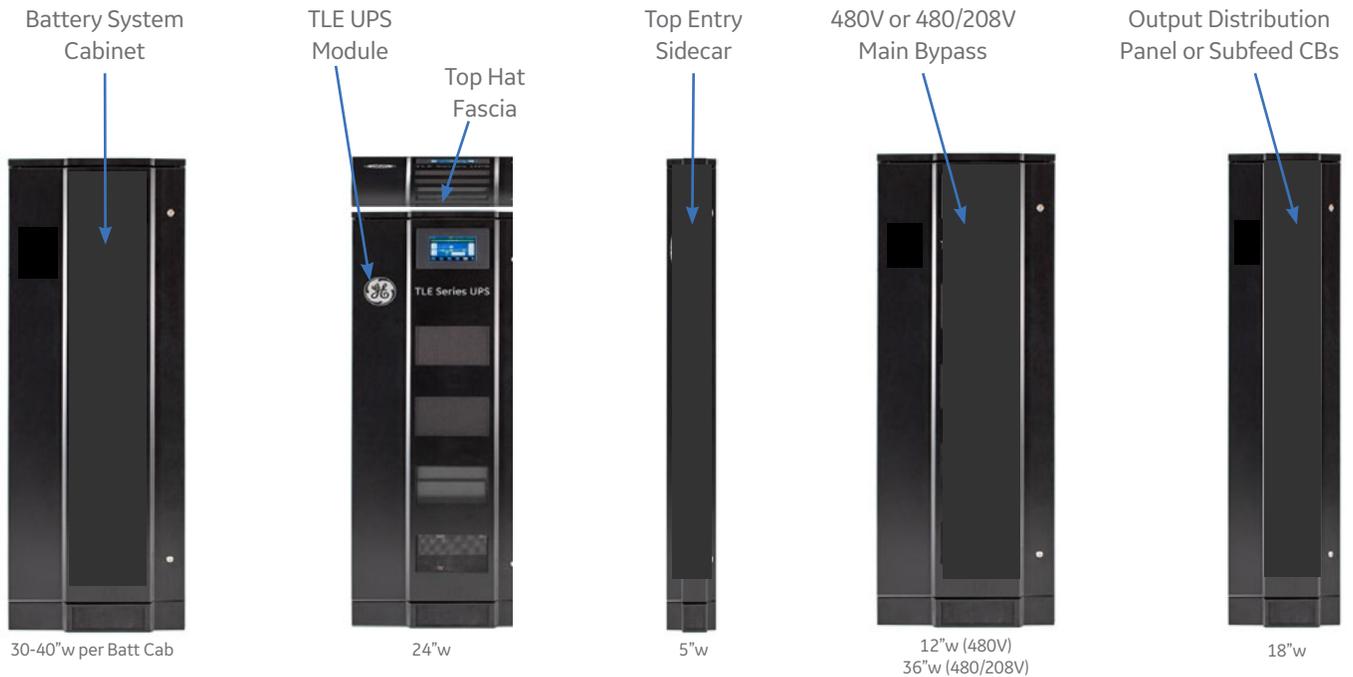
Battery Cabinet System Applications - VRLA Batteries

UPS POWER RATING	BATTERY RUNTIME	NO. OF BATTERIES	NO. OF BATTERY CABINETS	CABINET WIDTH (IN)	ASSEMBLY WIDTH (IN)	CABINET DEPTH (IN)	CABINET HEIGHT (LBS)	CABINET WEIGHT (LBS)	ASSEMBLY WEIGHT (LBS)
40Kva 40Kw	5	40	1	29.8"	29.8"	29.5"	75.0"	1,180 lbs	1,180 lbs
	8	40	1	29.8"	29.8"	29.5"	75.0"	1,500 lbs	1,500 lbs
	12	40	1	29.8"	29.8"	29.5"	75.0"	1,620 lbs	1,620 lbs
	21	40	1	29.8"	29.8"	29.5"	75.0"	2,140 lbs	2,140 lbs
	31	40	1	40.0"	40.0"	29.5"	75.0"	2,860 lbs	2,860 lbs
	41	40	1	40.0"	40.0"	29.5"	75.0"	3,220 lbs	3,220 lbs
	50	40	1	40.0"	40.0"	29.5"	75.0"	3,500 lbs	3,500 lbs
50Kva 50Kw	6	40	1	29.8"	29.8"	29.5"	75.0"	1,500 lbs	1,500 lbs
	7	40	1	29.8"	29.8"	29.5"	75.0"	1,620 lbs	1,620 lbs
	14	40	1	29.8"	29.8"	29.5"	75.0"	2,140 lbs	2,140 lbs
	23	40	1	40.0"	40.0"	29.5"	75.0"	2,860 lbs	2,860 lbs
	29	40	1	40.0"	40.0"	29.5"	75.0"	3,220 lbs	3,220 lbs
	38	40	1	40.0"	40.0"	29.5"	75.0"	3,500 lbs	3,500 lbs
	54	40	1	40.0"	40.0"	29.5"	75.0"	4,620 lbs	4,620 lbs
	58	80	2	40.0"	40.0"	29.5"	75.0"	2,860 lbs	5,720 lbs
80Kva 80Kw	6	40	1	29.8"	29.8"	29.5"	75.0"	2,140 lbs	2,140 lbs
	10	40	1	40.0"	40.0"	29.5"	75.0"	2,860 lbs	2,860 lbs
	15	40	1	40.0"	40.0"	29.5"	75.0"	3,220 lbs	3,220 lbs
	19	40	1	40.0"	40.0"	29.5"	75.0"	3,500 lbs	3,500 lbs
	28	40	1	40.0"	40.0"	29.5"	75.0"	4,620 lbs	4,620 lbs
	31	80	2	40.0"	80.0"	29.5"	75.0"	2,860 lbs	5,720 lbs
	41	80	2	40.0"	80.0"	29.5"	75.0"	3,220 lbs	6,440 lbs
	50	80	2	40.0"	80.0"	29.5"	75.0"	3,500 lbs	7,000 lbs
	73	80	2	40.0"	80.0"	29.5"	75.0"	4,620 lbs	9,240 lbs
100Kva 100Kw	6	40	1	40.0"	40.0"	29.5"	75.0"	2,140 lbs	2,860 lbs
	10	40	1	40.0"	40.0"	29.5"	75.0"	2,860 lbs	3,220 lbs
	13	40	1	40.0"	40.0"	29.5"	75.0"	3,220 lbs	3,500 lbs
	19	40	1	40.0"	40.0"	29.5"	75.0"	3,500 lbs	4,620 lbs
	22	80	2	40.0"	80.0"	29.5"	75.0"	4,620 lbs	5,720 lbs
	29	80	2	40.0"	80.0"	29.5"	75.0"	2,860 lbs	6,440 lbs
	38	80	2	40.0"	80.0"	29.5"	75.0"	3,220 lbs	7,000 lbs
	54	80	2	40.0"	80.0"	29.5"	75.0"	3,500 lbs	9,240 lbs
	63	120	3	40.0"	120.0"	29.5"	75.0"	4,620 lbs	10,500 lbs

TLE UPS - Battery Systems (Cont.)

UPS POWER RATING	BATTERY RUNTIME	NO. OF BATTERIES	NO. OF BATTERY CABINETS	CABINET WIDTH (IN)	ASSEMBLY WIDTH (IN)	CABINET DEPTH (IN)	CABINET HEIGHT (LBS)	CABINET WEIGHT (LBS)	ASSEMBLY WEIGHT (LBS)
120Kva 120Kw	7	40	1	40.0"	40.0"	29.5"	75.0"	3,220 lbs	3,220 lbs
	9	40	1	40.0"	40.0"	29.5"	75.0"	3,500 lbs	3,500 lbs
	15	40	1	40.0"	40.0"	29.5"	75.0"	4,620 lbs	4,620 lbs
	17	80	2	40.0"	80.0"	29.5"	75.0"	2,860 lbs	5,720 lbs
	23	80	2	40.0"	80.0"	29.5"	75.0"	3,220 lbs	6,440 lbs
	29	80	2	40.0"	80.0"	29.5"	75.0"	3,500 lbs	7,000 lbs
	42	80	2	40.0"	80.0"	29.5"	75.0"	4,620 lbs	9,240 lbs
	50	120	3	40.0"	120.0"	29.5"	75.0"	3,500 lbs	10,500 lbs
	73	120	3	40.0"	120.0"	29.5"	75.0"	4,620 lbs	13,860 lbs
150Kva 150Kw	5	40	1	40.0"	40.0"	29.5"	75.0"	3,500 lbs	3,500 lbs
	9	40	1	40.0"	40.0"	29.5"	75.0"	4,620 lbs	4,620 lbs
	12	80	2	40.0"	80.0"	29.5"	75.0"	2,860 lbs	5,720 lbs
	17	80	2	40.0"	80.0"	29.5"	75.0"	3,220 lbs	6,440 lbs
	21	80	2	40.0"	80.0"	29.5"	75.0"	3,500 lbs	7,000 lbs
	30	80	2	40.0"	80.0"	29.5"	75.0"	4,620 lbs	9,240 lbs
	38	120	3	40.0"	120.0"	29.5"	75.0"	3,500 lbs	10,500 lbs
	54	120	3	40.0"	120.0"	29.5"	75.0"	4,620 lbs	13,860 lbs
	78	160	4	40.0"	160.0"	29.5"	75.0"	4,620 lbs	18,480 lbs

TLE UPS - Matching Accessories



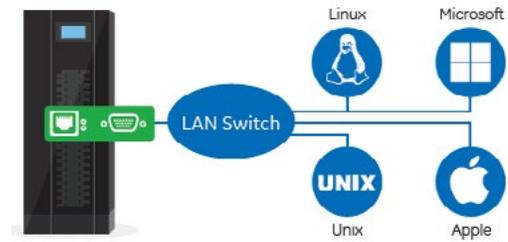
Notes:

1. Top Hat Fascia used only when matching accessories purchased.
2. Maintenance Bypass cabinet has mechanical or electric interlock option. 480/208V. cabinet has K-13 transformer within.
3. Output distribution cabinet - max 1 panelboard or max 6 subfeed CB's.

TLE UPS System - Monitoring & Connectivity

UPS Module Status/Alarm Monitoring

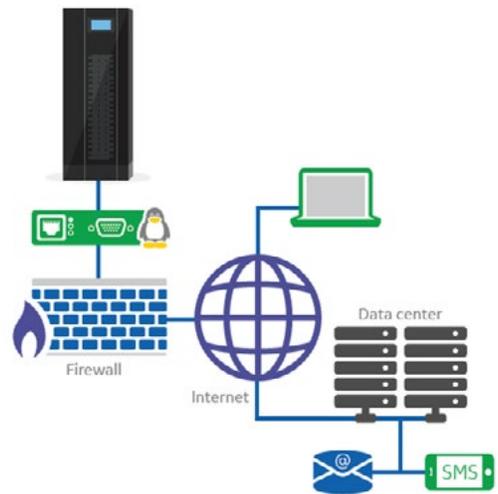
GE Data Protection software can communicate with the UPS over RS-232, USB or SNMP to receive status information and measurement values of the UPS. In case of a critical condition (time on battery, remaining battery autonomy time or low battery) for the load, the software starts a controlled shutdown. An enhanced alarm management system provides the possibility to start applications and send messages and e-mails for every upcoming or disappearing alarm.



iUPSGuard Diagnostic Monitoring

GE's iUPSGuard is a cloud based remote monitoring solution for UPS, providing status monitoring and alarm notification that supports all GE UPS product lines, anytime, anywhere. iUPSGuard notifies personnel of critical alarms and events via email or SMS, allowing a user or GE technician to make timely decisions on critical conditions. With comprehensive data collection and analysis iUPSGuard is not only a remote monitoring & diagnostics (RM&D) system, but the core of the integrated service offering GE Power Diagnostics.

- 24x7 monitoring of UPS status and operating parameters, alarms notification through email and SMS
- Highly secure and efficient data transmission, SSL encrypted with unidirectional communication
- iUPSGuard can communicate through various channels and monitors single UPS or parallel UPS systems through web/SNMP card
- Detailed reporting system of iUPSGuard provides valuable information on equipment operating conditions and trends over period of time
- Predictive algorithm to anticipate issues



Battery Plant Monitoring Via GE SBM System

SBM is a comprehensive and programmable management and monitoring system that protects the UPS battery string life. Batteries are prevented from overcharging and deep discharging.

- During UPS startup, the SBM is programmed with specific battery information.
- Calculates true battery autonomy and remaining battery backup time during utility outage.
- Measures the volts per cell of the battery system and compensates for temperature and load.
- Programmable features allow the user to select the frequency and type of battery tests that are performed. Frequency range can be from once per week to annually. Test type range can be from deep cycle to 3-min discharges.
- All tests logged in the UPS events menu and any failure is reported.
- All tests done automatically with the UPS on-line. Manual tests can be performed at any time.



Our UPS Protects Your Critical Load. Our Service Protects Your UPS Investment.

GE's UPS Services offerings range far beyond standard product support: from on-site services for risk-reducing installation and startup, to availability services to help you proactively reduce downtime and meet your service-level commitments. From installation to product retirement, warranty upgrades to remote monitoring, proactive care to 24/7 problem resolution, you can rely on GE's Weld service organization for all your electrical infrastructure support needs.

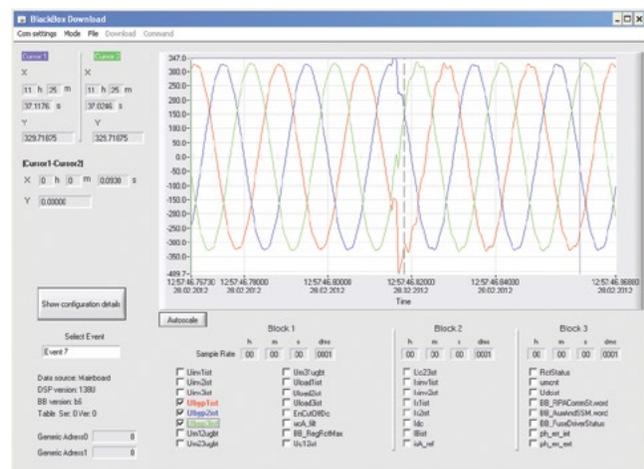


- 24/7 Emergency Service
- Spare Part Kits
- Product Replacement / Return
- Equipment Rentals
- Battery & Capacitor Replacements
- Maintenance Service Contracts
- Remote Monitoring & Diagnostics
- Technical Services
- Training for Maintenance Staff
- Product Training
- Web-Based Training

Service Hotline: 1 800 637 1738

Improved Diagnostic Capability

- Waveform capture, diagnostic and trend analysis
- Diagnostic details accessible to service personnel
- Simultaneous acquisition of 32 channels
- Sampling frequency up to 10kHz
- Smart trigger capability with up to 16 independent trigger sources to record only specific events with pre/post trigger data acquisition
- 8 buffers to record up to 8 events without losing older events





the green grid™
member



Imagination at work

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Plainville, CT 06062
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