T1kVA and T1.5kVA Tower Uninterruptible Power Supplies
Product Guide

The T1kVA and T1.5kVA Tower Uninterruptible Power Supply (UPS) offerings provide power protection with increased efficiency and simplified power management to safeguard the high-availability of Lenovo server environments. With efficiency ratings of up to 97%, these compact tower designs can help reduce energy usage without compromising performance or reliability.

Figure 1. Tower UPS unit (T1kVA or T1.5kVA)

Did you know?

T1kVA and T1.5kVA Tower UPS units feature Advanced Battery Management (ABM) technology that uses a unique three-stage charging technique that significantly extends battery service life and optimizes recharge time, compared to traditional charging.

T1kVA and T1.5kVA Tower UPS units can enhance system availability with individual receptacle groups or load segments that can be programmed and controlled, which allows mission-critical devices to be prioritized during shutdown to preserve battery run time if there is a prolonged power outage.

T1kVA and T1.5kVA Tower UPS units come standard with UPS Power Manager (UPM) power management software that integrates seamlessly with the major virtual platforms, which enables you to view and manage your entire power system from your current dashboard. It also triggers live migration during power outages and avoids data loss by gracefully shutting down virtual machines and hosts in a cluster if there is an extended power outage.

Ordering information

Table 1 shows the part numbers and feature codes for the T1kVA and T1.5kVA Tower UPS models and options.

Table 1. Ordering part numbers and feature codes

Description	Part number	Feature code
UPS units		
T1kVA Tower UPS (100-125VAC)	55951AX	A548 (5595-TU1)
T1kVA Tower UPS (200-240VAC)	55951KX	A549 (5595-TU1)
T1.5kVA Tower UPS (100-125VAC)	55952AX	A54A (5595-TU2)
T1.5kVA Tower UPS (200-240VAC)	55952KX	A54C (5595-TU2)
Options		
UPS Network Management Card	46M4110	6145
Environmental Monitoring Probe	46M4113	6146

The UPS models ship the following items:

- An accessory kit, which contains the following items:
    - Serial cable: 1.2 m (4 ft)
    - USB cable
    - Remote emergency power-off (REPO) connector
- A documentation kit, which contains the following items:
    - Documentation package
    - Software CD, which contains UPM software

The 100 - 125 V models (1AX and 2AX) ship with fixed 1.8 m NEMA 5-15P line cord. The 200 - 240 V models (1KX and 2KX) do not ship with line cords. Table 2 lists the compatible line cords, which are suitable for models 1KX and 2KX.

Table 2. Line cords for 200 - 240 V models (models 1KX and 2KX)

Description	Part number	Feature code
10A/250V C13 to NEMA 6-15P 2.8m line cord	46M2592	A1RF
Argentina 10A line C13 to IRAM 2063 (2.8M)	39Y7930	6222
Australia/NZ 10A line C13 to SAA-AS C112 (2.8M)	39Y7924	6211
Brazil 10A line C13 to NBR 6147 (2.8M)	39Y7929	6223
China 6A line C13 to GB 2099.1 (2.8M)	39Y7928	6210
Denmark 10A line C13 to DK2-5A (2.8M)	39Y7918	6213
European 10A line C13 to CEE 7/7 (2.8M)	39Y7917	6212
India 6A line C13 to Fig 68 (2.8M)	39Y7927	6269
Israel 10A line C13 to SI 32 (2.8M)	39Y7920	6218
Italy 10A line C13 to CEE 7/7 (2.8M)	39Y7921	6217
Japan 10A line C13 to JIS C-8303 (2.8M)	46M2593	A1RE
Korea 7A line C13 to KETI 15A/250V (2.8M)	39Y7925	6219
South Africa 10A line C13 to SABS 164/1 (2.8M)	39Y7922	6214
Switzerland 10A line C13 to SEV 1011 (2.8M)	39Y7919	6216
Taiwan 10A/250V C13/CNS 10917 2.8m line cord	81Y2375	A0RF
United Kingdom 10A line C13 to BS 1363 (2.8M)	39Y7923	6215

The T1kVA and T1.5kVA Tower UPS models also come equipped with a communication bay for the installation of an optional Network Management Card (46M4110). The Network Management Card (NMC) provides convenient, over-the-network UPS remote monitoring and management through a standard web browser or UPM software. The following figure shows the UPS NMC.

Figure 2. UPS Network Management Card

The NMC has the following features:

- Versatile connectivity through HTTP, SNMP, SMTP, Telnet, SSL, and SSH
- Simultaneous shutdown of protected servers
- Configuration of automatic email messages in response to UPS alarms and to transmit periodic reports
- Customizable actions, including automatic shutdown if there is an extended power failure with standard UPS Power Protector software
- Control of UPS on/off switching with a web browser
- Adjustment and control of load segments through the HTML interface, including sequential starting of the installation and optimization of backup time by shutting down non-priority systems
- Automatic date and time adjustment through an NTP server

- Dual stack IP v4/IP v6

- Recording of events and measurements in the card log

- Data and event logging in the nonvolatile memory

- Card firmware update through the network

- 10/100 Mb Ethernet (RJ-45 connector) with auto-negotiation

- Measurement of humidity and temperature with the optional Environmental Monitoring Probe (EMP)

- Easy installation (can be installed while the UPS is online to maintain the highest system availability)

An optional EMP (part number 46M4113) is used to report local temperature and humidity values and make that information available to management tools. The EMP connects to the UPS via the NMC. The EMP is shown in the following figure.

Figure 3. Environmental Monitoring Probe

The EMP has the following features:

- Monitors temperature, humidity, and status of two user-provided contact devices or sensors

- Connects to an NMC through an RJ-45 CAT5 Ethernet cable (1 m cable included with the EMP)

- Can be located up to 20 m (65.6 ft) from the UPS

- Measures ambient temperatures 0 - 80 °C (32 - 176 °F) with an accuracy of ±1 °C

- Measures relative humidity 10 - 90% with an accuracy of ±5%

- Displays temperature, humidity, and contact closure status through a web browser

- Supports user-defined alarm thresholds for temperature, humidity, and contact closure status

- Stores events in the NMC's event log

- Sends SNMP alarms to network management systems

- Sends e-mail notifications through SMTP

Features

A UPS is a device that acts as a defensive barrier between electronic equipment and incoming power problems. It conditions, regulates, and filters out power disturbances to ensure a clean power source for IT equipment. A UPS also provides battery backup if there is a power failure.

In today's high availability server environments, unplanned power outages or line quality irregularities can have a considerable financial effect on all sized businesses. The typical utility power is 99.9% available, but that means that there can be almost 9 hours of downtime a year, which includes brownouts and other power quality problems.

Selecting the right UPS can help protect against these potentially costly incidents.

The T1kVA and T1.5kVA Tower UPS units are most effective against five power problems: power failures, power sags, power surges, under-voltage, and over-voltage.

The T1kVA and T1.5kVA Tower UPS models offer the following features:

- High-efficiency protection delivers more real power (watts) in a compact design, lowering power, and cooling consumption
- Graphical Liquid Crystal Display (LCD) provides intuitive configuration, management, and monitoring capabilities in the following languages to reduce management complexity:
    - English
    - French
    - German
    - Spanish
    - Russian
    - Portuguese
    - Italian
- Hot-swappable batteries for maximum uptime, availability, and ease of maintenance
- Standard UPS Power Manager software provides effective local or remote power monitoring and management for servers and virtual machines and allows for graceful remote system shutdown
- ABM technology significantly extends battery service life and optimizes recharge time
- Load segments for individual control of receptacle groups to manage sequential shut downs and start ups and reserve battery run time for the most critical equipment
- Optional NMC for enhanced UPS monitoring and control over-the-network through a standard web browser
- Optional Environmental Monitoring Probe for thermal management requirements (temperature and humidity)
- Allows dual channel communication through the USB or RS-232 port and an optional NMC at the same time to maximize communications flexibility
- Remote flash upgradeable firmware for the UPS and NMC, which makes it an ideal solution for remote locations
- Includes a Remote On/Off (ROO)/Remote Power Off (RPO) port to control power of the UPS unit through a wired remote switch

Technical specifications

Table 3 lists the technical specifications for the T1kVA and T1.5kVA Tower UPS units.

Table 3. Technical specifications

Specification	T1kVA Tower UPS (100-125VAC)	T1kVA Tower UPS (200-240VAC)	T1.5kVA Tower UPS (100-125VAC)	T1.5kVA Tower UPS (200-240VAC)
General				
Part number	55951AX	55951KX	55952AX	55952KX
Form factor	Tower	Tower	Tower	Tower
Topology	Line interactive, high frequency, sinewave output			
VA/Watts rating	1000 VA/770 W	1150 VA/770 W	1440 VA/1100 W	1550 VA/1100 W
Efficiency (on utility power)	Up to 97%	Up to 97%	Up to 97%	Up to 97%
Energy Star compliant	No	Yes	Yes	Yes
Electrical input				
Input voltage	100 - 125 V AC	200 - 240 V AC	100 - 125 V AC	200 - 240 V AC
Input frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Max input amperage	8.8 A	5.3 A	12 A	7.1 A
Input connector	NEMA 5-15P (12 A)	IEC 320 C14 (10 A)	NEMA 5-15P (12 A)	IEC 320 C14 (10 A)
Input line cord	Fixed 1.8 m (6 ft) NEMA 5-15P	Optional (See Table 3)	Fixed 1.8 m (6 ft) NEMA 5-15P	Optional (See Table 3)
Electrical output				
Output voltage settings	100/120/125 V AC	200/208/220/230/240 V AC	100/120/125 V AC	200/208/220/230/240 V AC
Output frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Output power capacity	• 100 V AC: 833 VA/641 W • 120 - 125 V AC: 1000 VA/770 W	• 200 - 208 V AC: 1035 VA/693 W • 220 - 240 V AC: 1150 VA/770 W	• 100 V AC: 1080 VA/825 W • 120 - 125 V AC: 1440 VA/1100 W	• 200 - 208 V AC: 1395 VA/990 W • 220 - 240 V AC: 1550 VA/1100 W
Output connectors	8x NEMA 5-15R (12 A)	8x IEC 320 C13 (10 A)	8x NEMA 5-15R (12 A)	8x IEC 320 C13 (10 A)
Output load segments	• Primary: 4x 5-15R • Group 1: 2x 5-15R • Group 2: 2x 5-15R	• Primary: 4x C13 • Group 1: 2x C13 • Group 2: 2x C13	• Primary: 4x 5-15R • Group 1: 2x 5-15R • Group 2: 2x 5-15R	• Primary: 4x C13 • Group 1: 2x C13 • Group 2: 2x C13
Batteries				
Battery type	Valve Regulated Lead Acid (VRLA): Maintenance-free, sealed, and leak-proof			
Battery capacity	9 Ah	9 Ah	9 Ah	9 Ah

Specification	T1kVA Tower UPS (100-125VAC)	T1kVA Tower UPS (200-240VAC)	T1.5kVA Tower UPS (100-125VAC)	T1.5kVA Tower UPS (200-240VAC)
Battery management	ABM technology or temperature-compensated charging method (user selectable), automatic battery test, and deep discharge protection			
Battery replacement	Hot-swap internal battery			
External battery support	No	No	No	No
Typical backup times	See Table 5		See Table 6	
Communications and management				
USB port (Type B)	Yes	Yes	Yes	Yes
RS-232 serial port (RJ-45)	Yes	Yes	Yes	Yes
10/100 Mbps Ethernet port (RJ-45)	Optional with Network Management Card, 46M4110			
Environmental monitoring	Optional with Environmental Monitoring Probe, 46M4113 (requires Network Management Card 46M4110)			
Management software	UPS Power Manager and UPS Power Protector			
Control panel	Intelligent 5-button graphical LCD			
LED indicators	Power On, On Battery, and Alarm			
Remote On/Off and Power Off	Remote On/Off (ROO) and Remote Power Off (RPO) terminal block connector			

The following two tables list the expected period that the T1kVA and T1.5kVA Tower UPS models operate solely on batteries, depending on the load.

Table 4. T1kVA Tower UPS runtime chart

Load		Run time in minutes	
Percentage	Watts	T1kVA Tower UPS (100-125VAC)	T1kVA Tower UPS (200-240VAC)
20%	154 W	33	33
30%	231 W	21	21
40%	308 W	15	15
50%	385 W	12	11
60%	462 W	9	9
70%	539 W	8	7
80%	616 W	7	6
90%	693 W	6	5
100%	770 W	5	4

Table 5. T1.5kVA Tower UPS runtime chart

Load		Run time in minutes	
Percentage	Watts	T1.5kVA Tower UPS (100-125VAC)	T1.5kVA Tower UPS (200-240VAC)
20%	220 W	42	42
30%	330 W	25	25
40%	440 W	18	18
50%	550 W	13	13
60%	660 W	11	11
70%	770 W	8	8
80%	880 W	6	6
90%	990 W	5	5
100%	1100 W	4	4

Note: Battery backup times are approximate and can vary with equipment, configuration, battery age, and temperature.

Connectors and controls

The T1kVA and T1.5kVA Tower UPS units have a 5-button graphical LCD on the front. The LCD provides useful information about the UPS, load status, events, measurements, and settings.

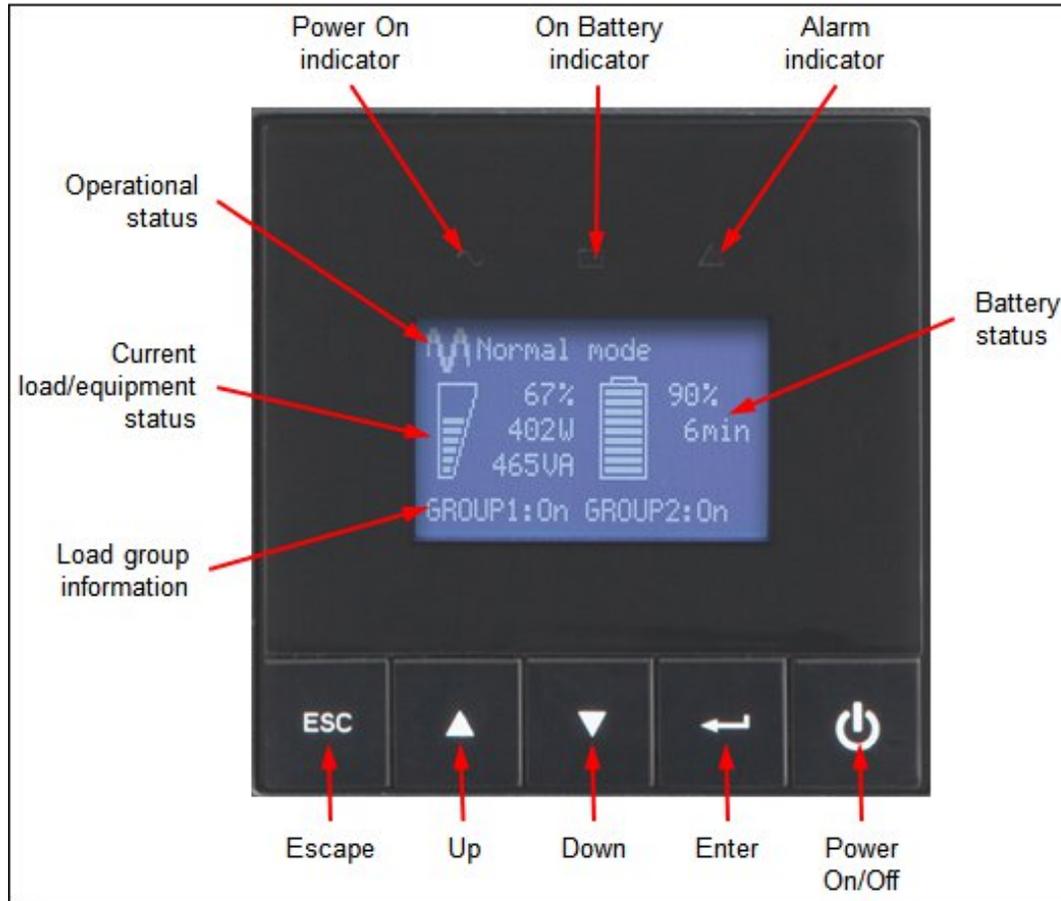The following figure shows the control panel on the front of the Tower UPS.

Figure 4. Control panel on the front of the Tower UPS

The following functions are available on the control panel:

- Status information: Displays the battery status, load percentage, output power, operational mode, and load group information.
- Measurements: Displays the output watts VA, amperage, power factor, voltage, frequency, input voltage, input frequency, battery voltage, efficiency, and power usage.
- Control: Displays the battery test, reset error state, configure load segments, clear power usage measurements, and restore settings.
- Settings: Allows you to change product general parameters and set input and output parameters, on/off conditions, and battery configuration.
- Fault log: Displays the event log and alarm history.
- Identification: Displays the machine type, model, and serial number of the unit and the firmware level of the UPS, including the optional NMC's firmware level, and IP address, if installed.

The following figure shows the rear view of the T1kVA Tower UPS (100-125 VAC) (55951AX).
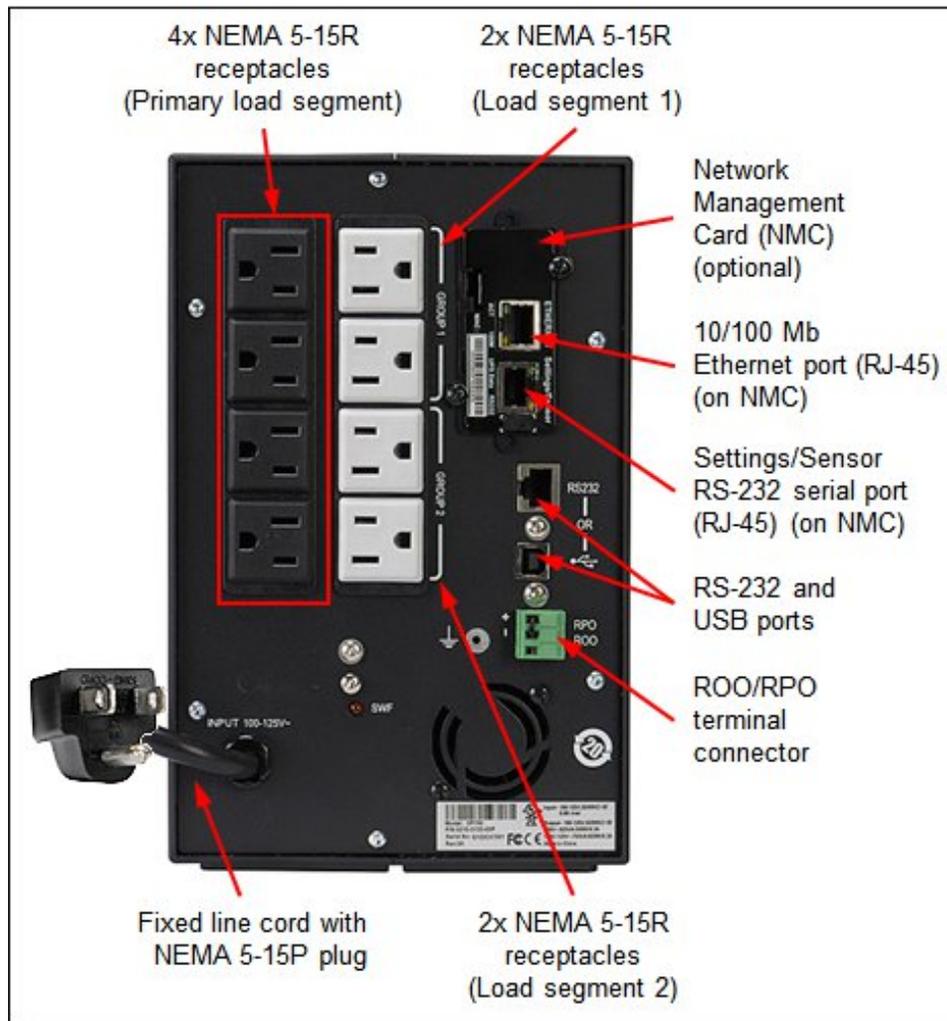

Figure 5. Rear view of the T1kVA Tower UPS (100-125VAC) (55951AX)

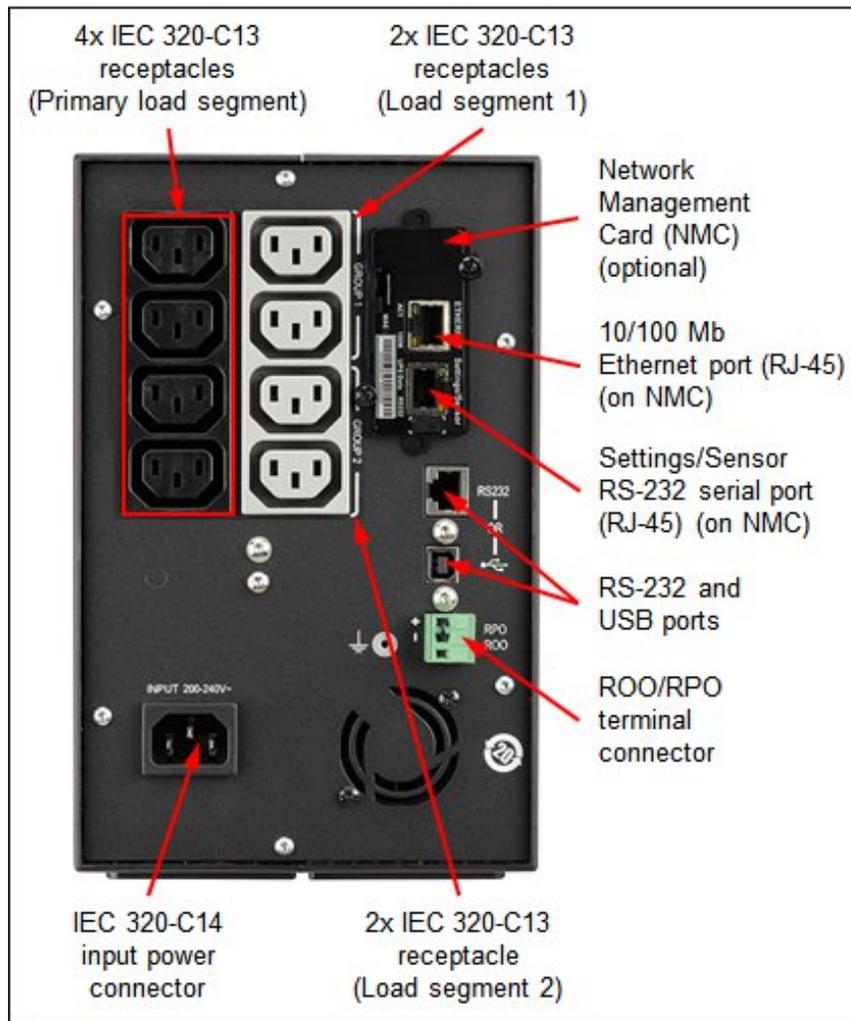The following figure shows the rear view of the T1kVA Tower UPS (200-240VAC) (55951KX).

Figure 6. Rear view of the T1kVA Tower UPS (200-240VAC) (55951KX)

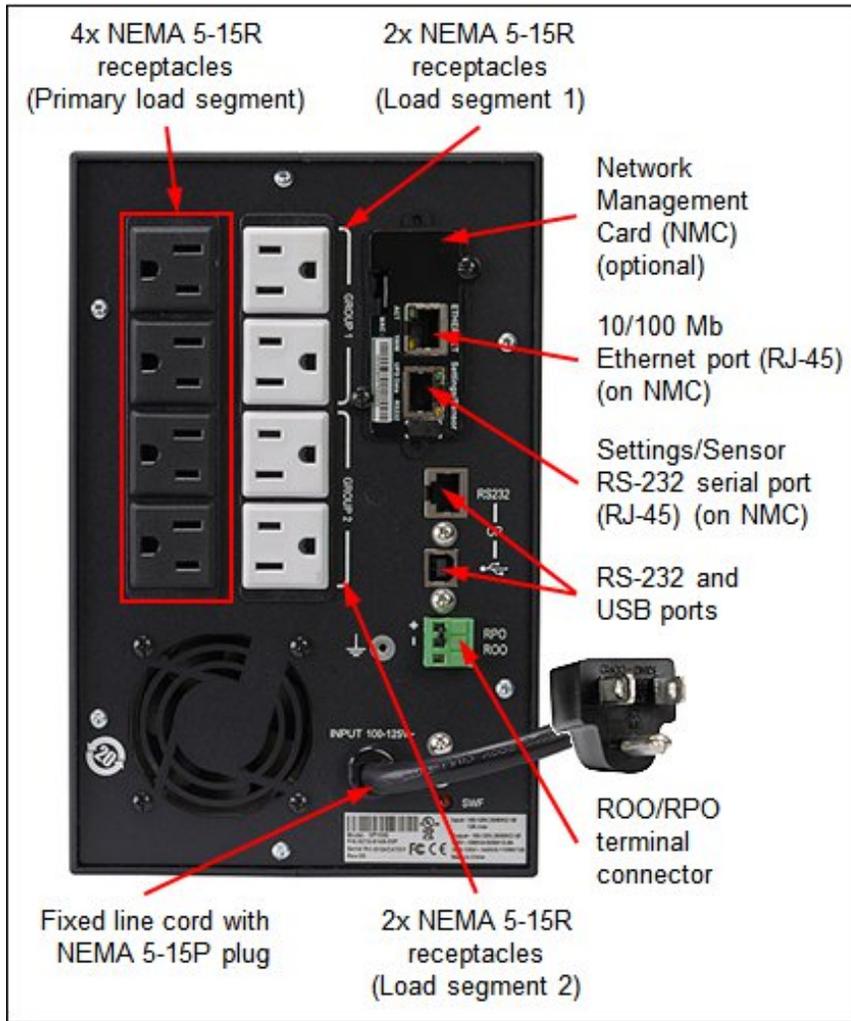The following figure shows the rear view of the T1.5kVA Tower UPS (100-125VAC) (55952AX).

Figure 7. Rear view of the T1.5kVA Tower UPS (100-125VAC) (55952AX)

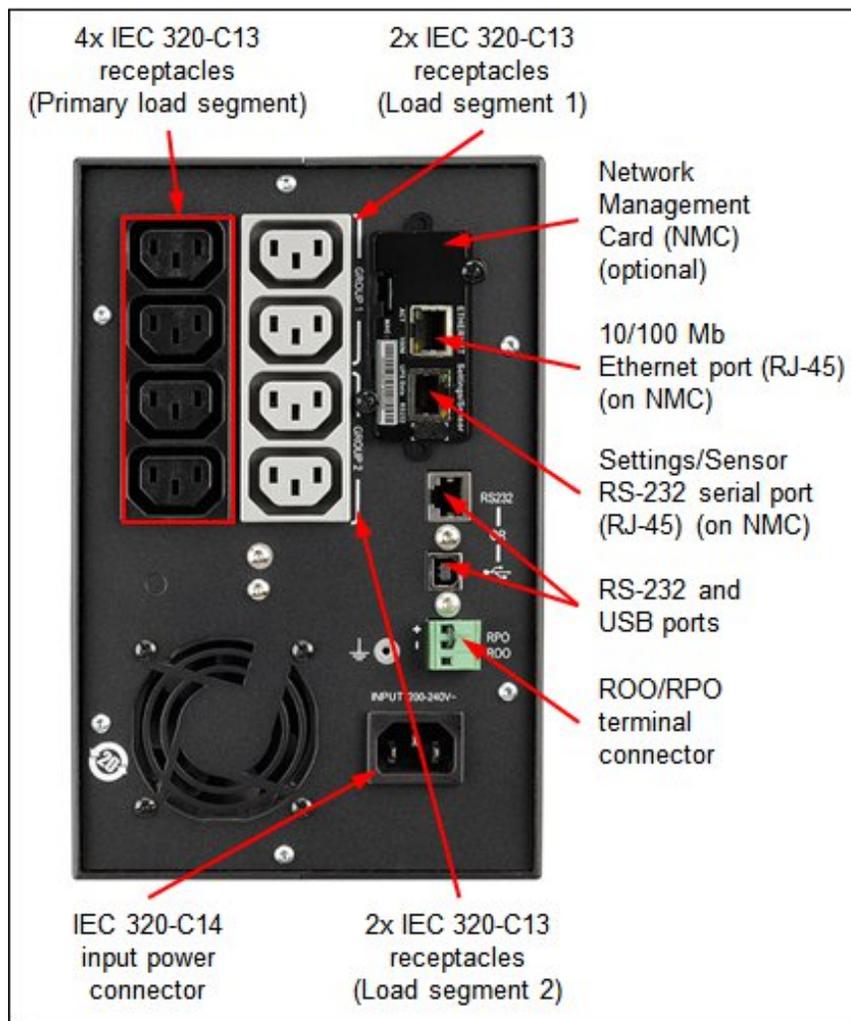The following figure shows the rear view of the T1.5kVA Tower UPS (200-240VAC) (55952KX).

Figure 8. Rear view of the T1.5kVA Tower UPS (200-240VAC) (55952KX)

Physical specifications

The T1kVA Tower UPS unit has the following physical specifications (approximate):

- Height: 233 mm (9.1 in.)
- Width: 150 mm (5.9 in.)
- Depth: 345 mm (13.6 in.)
- Weight: 11.5 kg (24.4 lb)

The T1.5kVA Tower UPS unit has the following physical specifications (approximate):

- Height: 233 mm (9.1 in.)
- Width: 150 mm (5.9 in.)
- Depth: 445 mm (17.5 in.)
- Weight: 16.2 kg (35.3 lb)

Operating environment

The T1kVA and T1.5kVA Tower UPS units are supported in the following environment:

- Temperature (operation):
    - T1kVA Tower UPS: 0 - 35 °C (32 - 95 °F)
    - T1.5kVA Tower UPS: 0 - 40 °C (32 - 104 °F)

- Relative humidity: 5 - 95%

- Maximum altitude (operation): 3,000 m (9,843 ft)

Note: These UPS units are not supported in a maritime environment.

Agency approvals

The T1kVA and T1.5kVA Tower UPS units conform to the following regulations:

- FCC
- UL
- CSA or cUL
- CE Mark
- NOM
- GOST
- BSMI Taiwan
- CB Report
- VCCI
- C-Tick (Australia)
- IRAM (Argentina)

Warranty

The T1kVA and T1.5kVA Tower UPS have a three-year limited warranty. Optional features include a one-year warranty.

Management software

Optional software can be downloaded to be used the UPS units. This software is the UPS Power Manager (UPM) and UPS Power Protector (UPP) software. The UPM software can manage multiple devices. The UPP software is used to manage a single device. Note that a device refers to a UPS or a PDU.

UPS Power Manager

The UPS Power Manager (UPM) software is free to use for up to 10 devices (PDUs or UPS units). It is available either as a Windows application or a virtual appliance (OVF file). Download the software from: https://datacentersupport.lenovo.com/us/en/solutions/lnvo-ups-mgmt

For up to 100 devices, a Silver license can be purchased. For up to 600 devices, a Gold license can be purchased. The following table shows the part number ordering information for each version of the UPM software.

Table 6. UPM part numbers

Part Number	Feature Code	Description
None	None	Basic (free) UPM software (1-10 devices can be managed)
00YE464	ATS2	Silver key license (up to 100 devices can be managed)
00YE465	ATS3	Gold key license (up to 600 devices can be managed)

The purchase of a Silver or Gold license adds additional management features not found in the Basic license. The following table shows the UPM licenses and features for each license when managing Lenovo UPS units.

Table 7. Comparison of UPM features

Features of UPM	Basic License (free)	Silver License	Gold License
Number of devices (UPS or PDU)	Up to 10	Up to 100	Up to 500
Identify and monitor third-party power devices	Yes	Yes	Yes
Shut down server and host without crashing	Yes	Yes	Yes
Configuration Policy	Yes	Yes	Yes
Control rack PDUs (on, off and reboot sections or outlets) (1)	Yes	Yes	Yes
Plug-in for VMware vCenter	Yes	Yes	Yes
Enter and exit maintenance mode	Yes	Yes	Yes
Shutdown Virtual Hosts (e.g. VMware ESXi)	Yes	Yes	Yes
Shutdown Storage	Yes	Yes	Yes
Advanced Event Action with Standard Events	No	Yes	Yes
Miscellaneous Advanced Actions, Generic SSH action	No	Yes	Yes
Shut down specific, targeted virtual machines	No	Yes	Yes
Migrate virtual machines to targeted hosts	No	Yes	Yes
Virtual machines load shedding	No	Yes	Yes
Trigger targeted, automatic advanced actions	No	Yes	Yes
Safely shut down and restore high availability environments	No	Yes	Yes
Fully virtualized cluster shutdown	No	Yes	Yes
Integrated with Microsoft Hyper-V virtualization platform to facilitate guest virtual machine shutdown or suspend, and graceful shutdown of the Hyper-V hypervisor	No	Yes	Yes
Integrated with VMware vSAN hyperconverged infrastructure software to enable graceful shutdown of logical data layer used by vSAN and full vSAN clusters	No	Yes	Yes
Integrated with Nutanix Acropolis Hypervisor to gracefully shut down of user VMs, controller VMs then AHV on Lenovo HX appliances running AHV	No	Yes (2)	Yes
Manage third-party power devices	No	No	Yes
OpenStack monitoring and control	No	No	Yes

(1) Support for SNMPv1 required at target device
(2) Requires UPM v1.65.221 or higher

UPM brings managing various power and environmental devices under control through a single, web-based interface. The UPM software solution ensures system uptime and data integrity by allowing you to monitor, manage, and control the devices on your network remotely.

The UPM user interface is shown in the following figure.
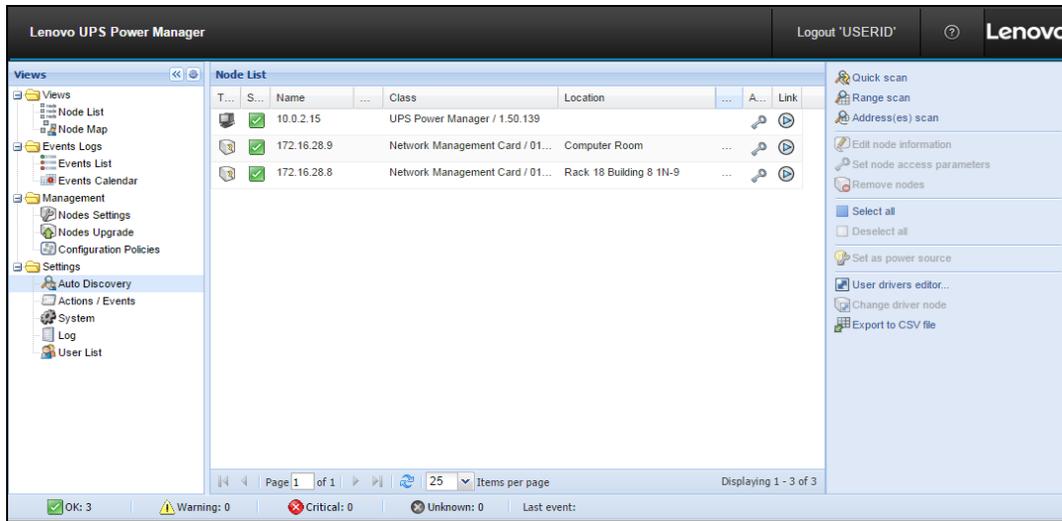
Figure 9. UPM User Interface

The UPM software offers the following features:

- Monitors and manages multiple power and environmental devices from a web browser or your virtual machine management dashboard
- Seamlessly integrates into popular virtualization infrastructures, including VMware ESXi, Microsoft Hyper-V, Citrix XenServer, and Linux KVM
- Triggers live migration for virtual machines during power outages
- By using a user-definable tree structure, enables grouping, access, and management of multiple devices across multiple locations
- Monitors power consumption, which helps track ways to improve energy efficiency
- Uses auto discovery to provide fast installation by automatically detecting devices on the network
- Mass-upgrades firmware, which reduces network management card setup and maintenance time

UPS Power Protector

The UPP software is free to download and use. Download it from the following links (v1.52.007):

- Windows: https://datacentersupport.lenovo.com/us/en/downloads/DS119231
- Linux: https://datacentersupport.lenovo.com/us/en/downloads/DS119230

UPP software facilitates automatic, graceful shutdown of computers, servers, and network devices that are powered by a UPS, which saves all work-in-progress and ensures data integrity. UPP's user interface provides detailed information about connected servers and UPS units through USB and serial or network communication.

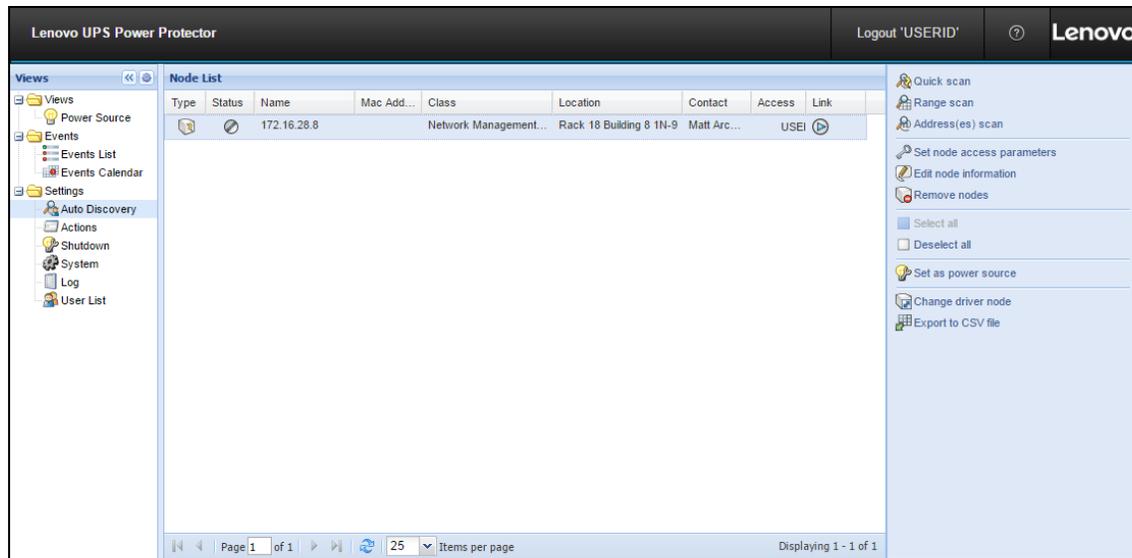The UPP user interface is shown in the following figure.

Figure 10. UPP User Interface

The UPP software offers the following features:

- Helps avoid data loss by gracefully shutting down computers and virtual machines or servers that are powered by a UPS during an extended power outage
- Keeps servers running smoothly by automatically identifying hang-ups and rebooting the machine by using a watchdog capability
- Provides redundancy capability for dual-cord servers
- An easy-to-use web browser interface
- Communicates with the protected device directly (via USB or serial) or through the network (via NMC)

Supported servers

The T1kVA and T1.5kVA Tower UPS offerings are compatible with all ThinkSystem, System x and ThinkServer systems and other devices that require AC power.

To determine the best fit UPS for a particular configuration, the following needs to be considered:

- Total power load of the hardware that will be connected to the UPS
- Number and type of outlets required
- UPS outlet and group limitations for connecting the hardware to the UPS

To determine chassis, node and server overall power capacities, use the Power Configurator tool. The tool can be downloaded from http://support.lenovo.com/documents/LNVO-PWRCONF

To determine the power draw of other devices such as storage and switching that will be attached to the UPS, refer to the products user manual for the maximum power draw.

For additional technical information on the UPS line cords, outlets and grouping refer to the UPS Technical Reference, https://support.lenovo.com/docs/UM104477

Related publications and links

For more information, see the following resources:

- Tower UPS product page
  https://www3.lenovo.com/us/en/data-center/servers/server-options/system-x-options/rack-and-power-infrastructure/upss/c/ups
- Power and Cooling Technical References:
  http://support.lenovo.com/us/en/documents/lnvo-powinf
- Power Configurator Tool:
  http://support.lenovo.com/au/en/documents/LNVO-PWRCONF
- *Installation and User's Guide - Tower UPS*
  http://systemx.lenovofiles.com/help/topic/com.lenovo.sysx.racks.doc/rk_tower_ups_iug.pdf
- *Network Management Card User Guide*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085199
- US Announcement Letter
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS114-100

Related product families

Product families related to this document are the following:

- Uninterruptible Power Supplies

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