TRYSTAR®

Model ES
UNINTERRUPTIBLE POWER SYSTEM

4500 VA to 15500 VA SINGLE PHASE

True online double conversion design with a field-proven track record of protecting mission critical applications and preventing downtime.

Applications:

- I.T. Network Server Rooms
- Small To Medium Data Centers
- Industrial Controls And Automation
- Healthcare I.T.
- Business Continuity Requiring Extended Runtimes

Industry Leading 3-Year Warranty!

15765 Acorn Trail / Faribault, MN 55021 / 507.333.3990

TRYSTAR.com

PROVEN TECHNOLOGY + INNOVATION...

Trystar engineers and manufactures the industry's highest quality **uninterruptible power systems,** capitalizing on many years of expertise. We have an enviable reputation for quality, which is reflected in the design, workmanship, and performance of our products.

Our true online, double conversion UPS design is a field-proven Trystar standard, with a solid track record of protecting mission critical applications and preventing downtime. For you, this translates into trusted performance and reliability.

From its aesthetically-pleasing innovative design... to its ease of installation and user-friendly operation, the **"Model ES"** UPS is the right choice to provide conditioned, continuous back-up power for today's mission critical applications.

Product Snapshot

Technology:	True online, double conversion UPS, with auto matic static bypass.
Size Range:	4500 VA to 15500 VA single phase.
***Input Voltage:**	120, 208, 208/120, 220, 240, 240/120, 347, 480, or 600
***Output Voltage:**	120, 208/120, 240/120, or 240/208/120
Output Performance:	±1.5% voltage regulation and zero transfer time to battery.
Frequency:	60 Hz models, with input and output VAC listed above. 50 Hz models available. See Page 6 for input and output VAC configurations.
Dimensions:	UPS Cabinet Style S: 17" W x 36.5" D x 37.5" H UPS Cabinet Style T: 22.5" W x 36.5" D x 49" H Optional External Battery Cabinet: 22.5" W x 36.5" D x 49" H *Cabinet Style dependent on kVA rating, battery run time desired, and input/output voltage configuration.
***Battery Backup:**	Internal full-load runtimes from 5 to 70 minutes. Extended runtimes avail able from 1 to 4+ hours.
***Output Distribution:**	Locking and non-locking receptacles and circuit breaker options.

Choosing A New UPS?

There are certainly a lot of choices. May we suggest a UPS that provides you with the following?

- Extended battery backup time, without the need for additional cabinetry.
- An internal computer-grade isolation transformer providing electrical noise attenuation and power conditioning.
- Nominal input voltage options from 120 VAC to 600 VAC, with conversion to the exact nominal output voltage needed, even in bypass.
- A secure maintenance bypass system that assures a fully in-sync transfer, and allows maintenance to be performed without shutdown.
- An information-rich color monitor with an easy-to-use, high resolution touch-screen display.
- Full network communications, including options for Ethernet TCP/IP, MODBUS TCP/IP, or MODBUS 485.
- Output distribution options where you decide the exact receptacles and/or breakers supplied.

If some or all of these features are on your “must include” UPS checklist...

don’t compromise! Choose the **“Model ES” Uninterruptible Power System... the complete, integrated back-up power solution!**

= THE INTEGRATED, “ONE-BOX” UPS SOLUTION

The “Model ES” UPS — Information At Your Fingertips!

Advanced Digital Monitoring --- The Intellistat TS™

The full-featured, user-friendly **Intellistat TS** ™ monitor provides quick and easy access to the **“Model ES”** UPS’s electrical parameters, system status, and event logs. The monitor displays operational conditions including system normal, percent battery capacity remaining, and battery test in progress. Alarm conditions are displayed on the screen, together with an audible alarm.

A color, high resolution, LCD touchscreen display allows the entry of date / time values, system setpoints, alarm threshold settings, and password information into the monitor. The **Intellistat TS** provides complete system diagnostics, including user-programmable automatic battery testing and date / time stamped logging of the results.

The **Intellistat TS** is an industry-leading UPS monitor and display that is information-rich, easy to use, and a welcome departure from mechanical pushbuttons, and traditional 2-row LED displays.

Standard Communications

For standard communications, the **“Model ES”** includes a hardwired terminal strip interface for remote indication of UPS on battery, low battery warning, on static bypass, and general alarm conditions. Relay contacts are potential-free, normally open, and rated for 120 VAC, 0.5 amps. These status and alarm contacts may be wired to a factory-provided “Remote Annunciator” panel with status LEDs and an audible alarm.

Additionally, standard RS232 communications (via a USB port) allow access to electrical parameters, system status, alarms, system setpoint programming, and the test / alarm logs.

The **Intellistat TS’s** main status screen displays the power flow through the **“Model ES”.** Status bar graphs indicate the percent load and battery charge levels. Alarm indicators will be “red” in the event of overload or user-programmable low-battery conditions. A battery status indicator turns “yellow” when the UPS is on battery, or “red” if a weak battery condition is detected. A screen banner displays the UPS status. When the UPS is on battery, this screen banner also displays the elapsed time on battery.

Optional NetMinder™ Communications

NetMinder Slot Card

The ***NetMinder Slot Card*** integrates the **“Model ES”** into an Ethernet TCP/IP, MODBUS TCP, or MODBUS RS485 network with a specific IP address. The ***NetMinder*** offers you remote monitoring of the UPS status, battery test pass/fail results, alarm conditions, and electrical measurements via a web browser, without the need for any external software. Remote notification of alarms and status are available to you via SNMP, e-mail, and network

broadcast messaging. Temperature and humidity sensing interface are also available.

NetMinder RCCMD Shutdown Software

The ***NetMinder RCCMD*** is a client-side application that performs the orderly, unattended shutdown of your critical computers or servers.

NetMinder UNMS II UPS Network Management System

The ***NetMinder UNMS II*** is a Windows-based, server-side application that allows you to view and manage multiple, network-connected UPS's from a single computer. Using the Basic Version, you can monitor up to (9) UPS's... the Enterprise Version monitors even more UPS's, as well as environmental sensors or alarm contacts, and features a customizable graphical interface.

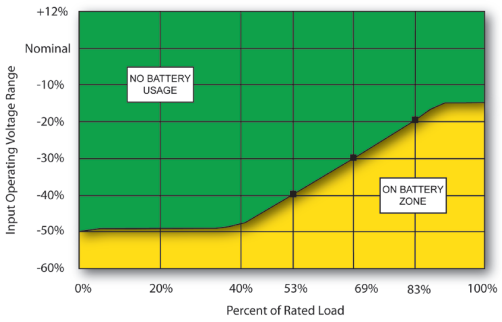
Note: The NetMinder RCCMD and UNMS II both require using the ***NetMinder Slot Card*** option. ***The UNMS II*** option will monitor the status of not only Trystar's UPS's, but also those of other manufacturers.

TOTAL POWER SECURITY

True Online Double Conversion With Static Bypass

The **"Model ES"** is a **true on-line double conversion UPS.** AC input power is converted to DC power to keep system batteries charged, then converted back to AC power to feed your mission critical equipment. Because the double conversion system reproduces its own regulated sinewave output, your equipment is no longer at the mercy of the input voltage distortions, frequency variations, voltage sags, surges, under-voltages, over-voltages, and power failures.

This UPS topology assures a true no-break transfer to and from battery operation, eliminating the concern about transfer times and the reliability of standby circuits. In the event of an overload condition or a detected problem within the UPS, a static bypass switch automatically activates to maintain power to protected equipment. cally activates to maintain power to protected equipment.



Adaptive Input Range

Adaptive Input Range technology is used to automatically broaden the input operating range as a function of load. This feature provides added security during deep brownout conditions, without battery consumption. Dependent on the percentage of load, the input voltage can drop as low as 50% of nominal before resorting to battery power, thus increasing battery life. In addition, **Adaptive Input Range** assures that the batteries will be at full capacity for a real emergency... a power outage.

Internal Shielded Computer-Grade Isolation Transformer

A specially-designed **internal shielded computer-grade isolation transformer** is available to protect your mission critical equipment from voltage spikes, transients, and the detrimental effects of common mode noise. The transformer generates a new ground for your system; maintaining the integrity of a clean, noise-free reference for your critical loads, even in bypass.

Internal transformer options are available to step line voltage up or down, and to convert 3-wire and 4-wire input configurations to match the exact needs of your protected equipment and satisfy output distribution requirements. An isolated output option of 240/208/120 VAC is available throughout the kVA range of the product line. Also note that a single 120 VAC, 2-wire plus ground output can supply up to 11000 VA of uninterruptible power! Refer to the "Voltage Configuration Charts" on Page 6 for a complete list of options.

Input Power Factor Correction With Less Than 5% THD

The **"Model ES"** goes beyond a traditional double conversion UPS. The advanced bi-directional **input power factor correction** circuitry and independently-generated sinewave reference, guarantee that the input current is free of harmonics regardless of non-linear load currents or input voltage distortion.

Secure Maintenance Bypass System

Maintenance bypass systems ensure that critical loads are never disrupted during maintenance or in an emergency. Traditionally, maintenance bypass switches are activated manually; connecting the critical load directly to an alternate power source without synchronization. Activating an out-of-sync bypass may drop or damage the load, and may cause damage to the UPS.

The **secure maintenance bypass system,** exclusive to the **“Model ES”,** automati cally invokes a synchronization command that forces the UPS to activate the static bypass first, before continuing to maintenance bypass mode. This system bypasses around the UPS electronics and controls, allowing for maintenance to be performed without shutdown or disruption of power to the load. If an internal isolation trans former is provided, the trans-former is kept in the power circuit so that system isolation, voltage trans-formation, and power conditioning are maintained. The **“Model ES”** secure maintenance bypass system brings large system UPS features to mid-sized applications.

SPECIFICATIONS

Power	
Ratings (VA)	4500, 5500, 6500, 7500, 8300, 9000, 10000, 11000, 12000, 13500, 14500, 15500 at 0.9 power factor
Topology	True online double-conversion UPS

Electrical Input	
Nominal Voltage	120V to 600V available at 60Hz 220V to 415V available at 50Hz See Voltage Configuration Charts for options
Voltage Range	+12%, -15% at full load +12%, -40% at 53% load (without battery usage)
Operating Frequency	+/-5% from nominal frequency online
Power Factor	Corrected to > .98 typical
Current Distortion	< 5% THD

Electrical Output	
Nominal Voltage	120V to 240 available at 60Hz 120V to 240V avail able at 50Hz See Voltage Configuration Charts for options

Voltage Regulation	+/-1.5% from nominal typical
Frequency	+/-0.5% while in battery operation mode
Overload	125% for 2 minutes, 150% for 30 seconds
Voltage Distortion	3% maximum THD with a linear loadeconds
Efficiency	87% typical

Battery

Type	Valve-regulated, sealed lead calcium, maintenance-free
Testing	Manual: Password-protected Automatic: User-programmable
Runtime	See Battery Runtime Chart Extended runtimes from 1 to 4+ hours available
Nominal Voltage	120 VDC
Charger	4-stage, temperature compensated 5 amp for bat tery options A and B, including 6500 VA models 10 amp for battery options C through J

General

Diagnostics	Continuous system self-check, including battery health
Static Bypass	Automatic bypass on overload or UPS failure
Maintenance Bypass	Integral, wrap around, make-before-break switch with a secure push-to-turn function
Optional Isolation Transformer	Internal shielded transformer available on all models provided in UPS Cabinet Style T
Output Distribution	Optional output circuit breakers and receptacles (Photo at right) See Output Distribution options (Back Cover)
Dimensions / Weights	See Page 6 for model dimensions. failureWeights are included in the Voltage Configuration Charts.

Communications

LCD Display	High resolution, color touchscreen display for monitoring system status and parameters, and to access programmable UPS and battery testing
Communication Port	Serial communications via USB
Network / Web Interface	Optional slot card for remote monitoring and reporting via Ethernet TCP/IP, MODBUS TCP or MODBUS RS485. Includes notification of alarms via SNMP, e-mail, and network broadcast messaging.
Relay Interface	Potential-free isolated status and alarm contacts via hardwired terminal strip. Contacts are normally open and rated for 120V, 0.5A
Emergency Shutdown	Hardwired terminal connection for Remote Emergency Power Off (REPO) contact.
Computer Shutdown	Optional software for unattended graceful shutdown of critical servers

Environmental

Operating Temperature	0°C (32°F) to 40°C (104°F) without derating Optimum battery performance and life at 25°C (77°F)
Storage Temperature	-20°C (-4°F) to 50°C (122°F) Battery storage at 25°C for 6 months. For each 9°C rise, reduce storage time by half.
Relative Humidity	0 to 95% non-condensing
Altitude	5000 feet (1500 meters) without derating
Audible Noise	52 to 54 dB, size and model dependent

Certifications

Safety	UL 1778 C-UL Canadian National Standard C22.2, No. 107.1 M01
EMI Compliance	FCC Part 15, Subpart J, Class A
Quality	ISO 9001:2008

See Back Cover for “Output Distribution Options”.

Note: Standard casters not visible in photograph.

Markings	UL, C-UL

VOLTAGE CONFIGURATIONS

Extensive Voltage Configurations

The **"Model ES"** offers an extensive range of input voltages, providing an exact voltage to match your site and application. Whether on the plant floor, in the computer room, or at a remote location, the **"Model ES"** is capable of connecting to whatever voltage is available. It is not necessary to spend time and money to reconfigure your existing electrical system.

The **"Model ES"** is capable of 60 Hz input voltage from 120 VAC to 600 VAC, or 50 Hz input voltages from 220 VAC to 415 VAC. Standard voltage configurations for 60 Hz models (both with and without an internal isolation transformer), and 50 Hz models are provided below.

UPS Cabinet Style S: 17" W x 36.5" D x 37.5" H UPS Cabinet Style T: 22.5" W x 36.5" D x 49" H Optional External Battery Cabinet: 22.5" W x 36.5" D x 49" H

For a thorough understanding of the following Voltage Configuration matrices, first consider your Input and Output VAC requirements. Then refer to the column of Output VA ranges to view the available sizes for your specific input and output voltages.

Model ES Voltage Configurations — 60 Hz Models without Internal Isolation Transformer

Output VA[1]	Input VAC	Output VAC	Weight w/o Batteries	UPS Cabinet Style w/ Internal Battery
4500 - 5500	120	120	266	S or T[2]
4500 - 11000	208/120	208/120	276	S or T[2]
4500 - 11000	240/120	240/120	276	S or T[2]
12000 - 15500	208/120	208/120	490	T
12000 - 15500	240/120	240/120	490	T

1 Output VA Sizes Available: 4500, 5500, 6500, 7500, 8300, 9000, 10000, 11000, 12000, 13500, 14500, 15500

2 UPS Cabinet Style T is optional to accommodate longer battery run times. **Add 214 lbs** if Cabinet Style T is selected. See Battery Run Time chart for options and battery weights.

Model ES Voltage Configurations — 60 Hz Models with Internal Isolation Transformer(s)

Output VA[3]	Input VAC	Output VAC	Weight w/o Batteries	UPS Cabinet Style w/ Internal Battery
4500 - 5500	120	240/208/120[4]	600	T
4500 - 5500	208, 220, 240, 347, 480, or 600	120	625	T
6500 - 7500	208, 220, 240, 347, 480, or 600	240/208/120[4]	755	T
6500 - 7500 8300-11000	208/120 or 240/120	240/208/120[4]	610 650	T
12000 - 15500	208/120 or 240/120	240/208/120	690	T
4500 - 7500 8300 - 11000 12000 - 15500	208, 220, 240, 347, 480, or 600	240/120	635 650 690	T

3 Output VA Sizes Available: 4500, 5500, 6500, 7500, 8300, 9000, 10000, 11000, 12000, 13500, 14500, 15500

4 120V @ 100% rated load, 2-wire plus ground. See note in the Model Number Guide on the Back Cover.

Model ES Voltage Configurations — 50 Hz Models with Internal Isolation Transformer(s)

Output VA[5]	Input VAC	Output VAC	Weight w/o Batteries	UPS Cabinet Style w/ Internal Battery
4500 - 5500 6500 - 7500	220, 230, 240, 380, 400, or 415	120	645 790	T
4500 - 7500 8300 - 11000 12000 - 15500	220, 230, 240, 380, 400, or 415	240/120	655 675 720	T
4500 - 5500 6500 - 7500	220 or 380	220	780 790	T
4500 - 5500 6500 - 7500	230 or 400	230	780 790	T
4500 - 5500 6500 - 7500	240 or 415	240	780 790	T
4500 - 7500 8300 - 11000 12000 - 15500	208, 220, 240, 347, 480, or 600	240/120	635 650 690	T

5 Output VA Sizes Available: 4500, 5500, 6500, 7500, 8300, 9000, 10000, 11000, 12000, 13500, 14500, 15500

BATTERY INTELLIGENCE & RELIABILITY

Battery Management System --- We Do It Smarter!

Batteries are the life-line of a UPS, and the key to the uptime of your networks and systems. Getting the greatest performance from your batteries requires knowing when to use the batteries, how low to discharge, and how to properly charge the batteries to quickly regain the stored energy for the next emergency. The **"Model ES"** battery management system meets these critical requirements by using a 4-stage, temperature-compensated battery charger for optimum control.

Model ES Battery Run Times Options (In Minutes)

Output Power		UPS Cabinet Style S w/Internal Battery		UPS Cabinet Style T w/ Internal Battery					UPS Cabinet Style T w/External Battery Cabinet		
VA	Watt	A	B	A	B	C	D	E	F	G	J
4500	4050	7		7	25	35	40	70	100	180	290
5500	4950	5		5	17	27	30	50	75	120	225
6500	5850				14	19	25	48	60	105	170
7500	6750				12	17	18	38	48	90	150
8300	7470				9	15	17	36	45	79	120
9000	8100				7	12	14	28	40	70	110
10000	9000				6	11	12	24	35	60	105
11000	9900					8	11	18	30	55	90
12000	10800					7	10	17	27	45	80
13500	12150					6	7	14	25	40	70
14500	13050						5	13	18	30	65
15500	13950							12	17	27	60

Battery Weights (See battery option letter; Indicator in the above matrix)

A = 218 lbs B = 277 lbs C = 318 lbs D = 451 lbs E = 616 lbs F = 1297 lbs G = 1627 lbs J = 2238 lbs

Notes: For total UPS system weight: Add the selected battery option weight above, to the UPS unit weight w/o batteries

Battery options F through J require an external battery cabinet, together with UPS Cabinet Style T. The external battery cabinet matches the dimensions of the UPS Cabinet Style T (22.5" W x 36.5" D x 49" H).

To account for total shipping weight, add 60 lbs to options A - E above, and add 120 lbs. to options F - J.

Longer battery run times are available other than those listed above. Battery options are also available for “in computer room” installations. Consult factory for details.

Product Snapshot

- Heavy-duty casters and adjustable leveling feet are provided for ease of installation and placement.
- UPS Cabinet Style T and matching external battery cabinets are designed with slide-out battery trays for ease of maintenance. Side access is not required for system installation, operation, or service.

Note: UPS Cabinet Style S requires right side access for normal service and battery replacement.

UPS Cabinet Style T shown with one (1) matching, external battery cabinet. This configuration accommodates battery options F through J in the above matrix.

For illustration purposes, battery cabinet is shown with front panel removed and bottom battery tray partially slid out.

OUTPUT DISTRIBUTION & MODEL NUMBER GUIDE

Model ES Output Distribution Options

Receptacle	Breaker / Pole	Voltage	Phase
5-15R2 [6]	15A / 1P	120V	1
5-20R2 [6]	20A / 1P	120V	1
L5-20R [7]	20A / 1P	120V	1
L5-30R [7]	30A / 1P	120V	1
L6-20R [7]	20A / 2P	208 or 240V	2
L6-30R [7]	30A / 2P	208 or 240V	2
L14-20R [7]	20A / 2P	240/120V or 208/120V	2
L14-30R [7]	30A / 2P	240/120V or 208/120V	2

6 Non-Locking Type, Duplex (2 outlets per receptacle)

7 Locking Type

Note: IEC 320 outlets and 50 amp receptacle options are available. Con sult factory.

Available on UPS Cabinet Style S

Breaker with Receptacle: Maximum of 3 Non-Locking Receptacles and 4 Locking Receptacles

Breaker Only Option for Hardwire Connection: Maximum of 8 Poles

Available on UPS Cabinet Style T

Breaker with Receptacle: Maximum of 4 Non-Locking Receptacles and 6 Locking Receptacles

Breaker Only Option for Hardwire Connection: Maximum of 16 Poles

The following Model Number Guide is for **“Model ES”** product offerings. **Refer to the “Voltage Configuration Charts” on Page 6, for the appropriate input and output voltage combinations.**

Model ES 4500 VA - 15500 VA UPS Model Number Guide

Product	Input Voltage	Output Voltage	Freq	VA	UPS Cabinet Style	Battery Option
ES	A = 120 B = 208 L = 208/120 I = 220 U = 230 C = 240 G = 240/120 V = 347 Q = 380 R = 400 F = 415 D = 480 E = 600	A = 120 L = 208/120 I = 220 U = 230 C = 240 G = 240/120 Z = 240/208/120*	X = 60Hz W = 50 Hz	4500 5500 6500 7500 8300 9000 10000 11000 12000 13500 14500 15500	S T	A B C D E F G G J

Example: ES-DGX-12000-TE

"Model ES" UPS with a 480 VAC input, 240/120 VAC output, 60 Hz, 12000 VA output power rating, Cabinet Style T, with 17 minutes of battery (internal) run time at full load.

Warranty: Trystar guarantees the UPS electronics and controls to be free from defects in material and workman ship for a period of (3) years following shipment from the factory. Battery warranty is 2-year full replace ment. On-site labor for warranty repair in the United States and Canada is covered for 90 days following shipment from the factory.

Contact Factory for Statement of Warranty details, and ask about our "Start Up Plus" service and Warranty Upgrades!

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15765 Acorn Trail / Faribault, MN 55021 / 507.333.3990
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