7.5 kVA to 25 kVA

HV Series

Uninterruptible Power Systems

Designed to be used with linear or non-linear loads.

Applications:

- Windfarm Power Substations
- SCADA / DCS
- Extensive LAN / WAN Systems
- Midrange Computing
- Information Technology
- Industrial Controls
- Mechanical Loads (Fans, Pumps)
- Extended Runtime Applications

UL 1778 Listed
C-UL Listed to CSA C22.2 No. 107.1-21

TRYSTAR®

HV SERIES

Trystar engineers and manufactures the industry's highest quality power conditioning and UPS equipment, 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.

We provide the widest range of power equipment for regulating, conditioning, isolating, purifying, and distributing incoming electrical power. All products incorporate state-of-the-art technology, optimizing performance characteristics for various applications. Our products protect sensitive electronic systems from erratic operation and failure due to power line transients, noise, brownouts, sags, surges, and total power outages.

HV Series UPS

The overall function of the **HV Series** UPS's is to take polluted, fluctuating, and erratic electrical power that exists in all areas today and purify or replace it (in the case of complete power outages) with well-regulated, computer grade power.

The **HV Series** UPS's maintain electrical power to the critical load for approximately 10 minutes to several hours. The backup time is a function of the amount of battery reserve that is purchased with the system.

System Power Analyzer (SPA)

The optional System Power Analyzer (SPA) is a user-friendly, precise metering and data acquisition system analyzer, which provides adaptive diagnostics, true RMS metering, power analyzation, and all electrical parameters of the UPS. Single, well-defined pushbuttons access electrical parameters, alarm messages, operating set points, and log functions. A backlit, 40-character alphanumeric LCD provides extremely sharp visual resolution of data and titles.

Features & Benefits

The **HV Series** products are designed to maximize backup time, protect your computers or critical loads, and monitor all the key parameters of electrical power including a log of events.

Features Include:

- Steady, Regulated Voltage to ±3% Extends Equipment Life
- Highest Level Performance Sine Wave Output
- 100% Power Conditioning
- No-break, Continuous Power Provides Seamless Switching to Battery Backup
- Audible Noise 50 - 55dB (model dependent)
- Field Expandable Power Rating and Battery Run Time
- Eliminates Unwanted Harmonic Frequencies From Incoming Line
- 93% Typical Efficiency – Proven Performance
- K-Factor 30
- Optional Extended Backup Time
- Optional NetMinder UPS Communications Software and Hardware
- Optional Internal and External Bypass
- Optional oversized charger for faster recharge time.

HV Series Display Monitor & Diagnostics Provide System Status

LED's Provide System Status

- Line Power ON (Green)
- Battery Charging (Green)
- Reserve Battery Power – 10 Segment LED Bar Graph (Red)
- Conditioned Power ON (Green)

Alarms

- On Battery Power
- Low Battery
- Charger Failure
- High Temperature
- Bypass
- Alarm Silence (Pushbutton)

Shutdown

- Battery Discharged
- Remote / Emergency Power Off
- Over Temperature
- Manual Restart Required
- Manual Restart (Pushbutton)

Optional System Power Analyzer (SPA).

Total Power Security

Built-In Isolation

It is a common fact that isolation transformers provide electrical security for the load, eliminate electrical noise, and produce a new clean ground for digital and communication signals. All **HV Series** UPS's include a power purifying isolation transformer (not commonly found in 7.5 kVA to 25 kVA UPS's), which protects your equipment from the most damaging power disturbances. This standard isolation transformer offers the user a choice of input and output voltage selections; and provides a grounded, separately derived source per NEC 250.

Input Power Factor Correction With Less Than 10% Total Harmonic Distortion (THD)

The **HV Series** goes beyond the traditional UPS. Double magnetic conversion prevents damaging load-generated harmonics from backing-up into the utility lines.

User-Friendly Full Monitoring Features

The **HV Series** has a full complement of diagnostic indicators, including "Alarm" and "Shutdown" (see Page 2). Status LED's include: Line Power ON, Battery Charging, Reserve Battery Power, and Conditioned Power ON.

Product Specifications:

Input

At 60 Hz	208 or 240 VAC; 120 VAC available up to 9 kVA
At 50 Hz	Consult factory for nominal voltage
Operating Range	+10% to -15% of nominal voltage
Frequency Range	±2.5 Hz
Power Factor	Self-correcting to >0.95 (approaching unity)
Input Harmonics	<10% iTHD (Current Total Harmonic Distortion)
Spike Attenuation	3000:1

Output

Sine Wave Voltage	Typical 3% harmonic distortion, any single harmonic
At 60 Hz	120 VAC; 120/208 VAC; 120/240 VAC
At 50 Hz	Consult factory for nominal voltage
Crest Factor	3.5 : 1
K-Factor	30
Power Factor	0.7 switch mode rated
Harmonic Attenuation	Load generated harmonics are attenuated 400% at the input
Line Regulation	Typically ±3%
Load Regulation	Typically better than ±3%
Isolation	Galvanic isolation

Performance

Overload Capability	125% for ten minutes
Surge Capability	150% of rated output
Frequency Stability	±0.2 Hz
Inner Winding Capacitance	0.01 picofarads (primary to secondary coupling)
Common Mode	120 dB (10^6 : 1 ground noise attenuation)
Transverse Mode	70 dB (3160 : 1 line noise attenuation) (-3 dB at 1 kHz; -20 dB per decade)
Reactive Power Correction	Typical non-linear load corrected to >0.95 at input (automatically self-correcting)

Environmental

Isolation	NEC article 250; complies with this standard that specifies a separately derived power source
Operating Temperature	0°C to 40°C without derating in any mode
Storage Temperature	-20°C to 50°C
Relative Humidity	95% non-condensing
Elevation	5,000 feet, 1500 meters

Agencies

- IEEE 587 Category B Guide for surge suppression; exceeds by 33%
- ANSI / IEEE C62.41 and .45 Category A and B
- FAA - G - 201e power factor specifications
- CBEMA and ANSI C84.1; exceeds specifications and recommendations
- IEEE 519

MTBF

Total System	100,000 hours
Transformer	200,000 hours
Mean Time to Repair	Less than one hour

Safety

- UL 1778
- C-UL Listed to CSA C22.2 No. 107.1-21
- FCC Article 15, Section J, Class A, will not cause harmful interference with any other electronic devices.

PROVEN SOLUTIONS

HV10500 Guarantees Broadcasting Signal From Radio Stations

A major radio station was having difficulty remaining on-the-air due to extreme voltage fluctuations. This particular station broadcast 24 / 7, so "dead-air" was an enormous cost, as well as market-ratings loss. The station leased space in a multi-floor commercial office building. Power was distributed to two panels — one handled the on-air studio, newsroom, and the microwave link to the remote transmitter site; the other panel handled the advertising / commercials studio and the phone and voicemail network.

Because of space restrictions and in order to support both panels, all the loads were measured and evaluated separately. The HV10500 was installed to supply back-up power to existing applications and allow for any future expansion. The radio station was impressed with Trystar's solution. They referred their sister station with similar power problems to Trystar and another HV was installed there.

HV13000 Provides Back-up Power To Industrial Manufacturing Application

A steel galvanizing company's production was suffering from voltage regulation problems and periodic power outages. The critical component of their operation was a device that measured the thickness of the galvanization applied to the steel.

The unsurpassed voltage regulation, power conditioning, and battery back-up of the HV13000 was the perfect solution for their galvanizing operation. Productivity returned because the device was protected from any kind of power disturbance, including a full outage.

HV14000 Provides Regulated Power to Windfarm Substation DC and AC Loads

A major renewable energy company installed a 27-megawatt windfarm, which was comprised of (9) 3-megawatt wind turbines. The annual megawatt-hours of electricity generated by this windfarm were enough to power 6800 homes. To maintain the successful operation and protection of the windfarm substation (and the 6800 residential customers receiving the wind-generated electricity), it was imperative that the energy company maintain the reliable operation of its protective and control systems at the substation — thus the need for a UPS system that would provide the necessary battery back-up power to both the substation's DC and AC loads. The protected DC loads included the substation circuit breaker, protection relays, and the substation SCADA system. The protected AC loads included the substation's telecom equipment, lighting circuits, and the wind turbine SCADA systems.

The HV14000 was determined to be the most cost-effective and proven solution, providing complete load immunity from all line disturbances and power interruptions, without any disruption or loss of AC and DC output power. This rugged UPS provided the required rapid recharge current to the batteries, provided the required amps of power to the "standing" DC loads, and provided more than ample power to the substation AC loads.

For our customer's privacy, this photo is a representation of the actual site.

COMMUNICATIONS

Optional network communications provide the status and condition of the **HV Series** UPS and the incoming electrical power, as well as protect the LAN / WAN from unwanted downtime and unnecessary maintenance costs when the NetMinder™ RCCMD (see below) is installed on the network computers. Contact the factory for additional product details.

NetMinder™ CS141 Series of Ethernet Adapters

The NetMinder CS141 series of adapters integrate the **HV Series** UPS into an Ethernet TCP/IP, MODBUS TCP/IP, or MODBUS RS485 network. These adapters provide remote monitoring of UPS status and alarm conditions via a web browser. Remote notification of alarms and battery status are available via SNMP and e-mail; and are also viewable on a webpage.

Used with NetMinder RCCMD (a separate client-side software application to perform an orderly, unattended shutdown of servers), all CS141 adapters provide added network protection from downtime, and prevent unnecessary maintenance costs that result from data corruption and server crashes. RCCMD receives its shutdown instructions from either a CS141 web server or a "UNMS II" (UPS Network Management System) server.

The NetMinder CS141 Ethernet Adapter is available in (3) unique versions:

CS141B: Basic Ethernet / SNMP / TCP/IP / MODBUS TCP/IP communications used in UPS applications.
CS141L: Advanced version, includes all functionality of the basic version, plus the addition of temperature and humidity sensing capability, and 4 auxiliary contact closure inputs.
CS141L-485: Adds MODBUS RS485 communications to the advanced version of the NetMinder CS141L. However, temperature and humidity sensing is not available in this version.

NetMinder CS141 Features & Benefits

- Real-time Remote UPS Monitoring
- Web Server Based
- MODBUS ASCII and RTU
- Graphic Event and Data Trending
- Exportable Data and Event Logging for Trending Analysis and Troubleshooting

BACnet Communications Capability

The NetMinder CS141 adapters are able to communicate over a BACnet/IP or MS/TP network with the addition of customized external hardware. Consult factory for details.

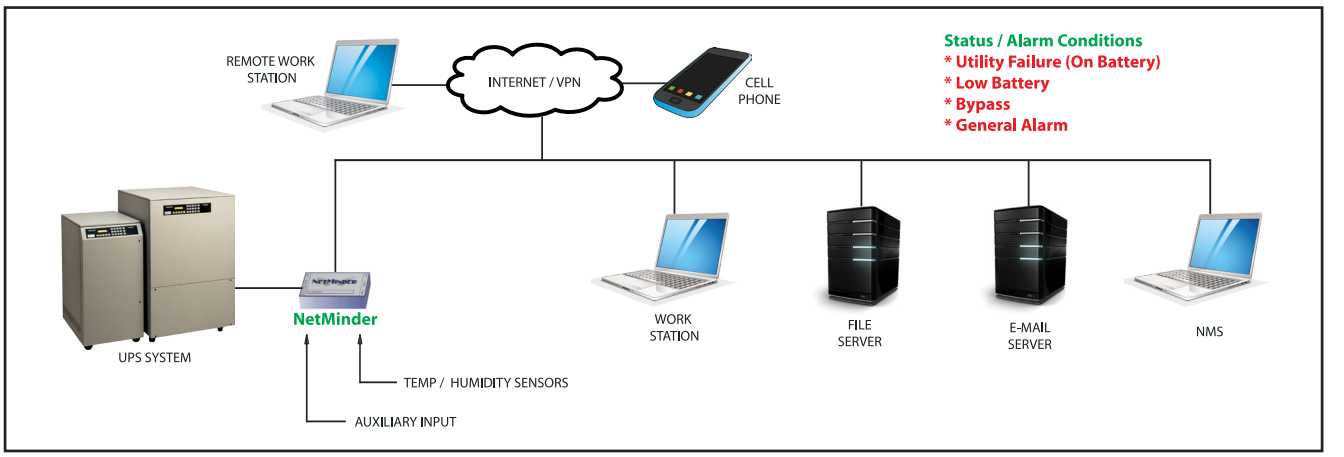
Optional "UNMS II" Software

The "UNMS II" (UPS Network Management System) software is a centralized monitoring package that will reside on a Windows-based network server, and provide users with the ability to monitor multiple UPS's from a single network device (e.g., desktop computer, tablet, laptop, or smartphone). Besides reporting via the home screen display, the "UNMS II" can be programmed to send an e-mail or SNMP message that reports the alarm or status condition. Additionally, "UNMS II" keeps a history log of all alarms and system events, classified according to severity. These log files can be viewed on the device, and also be exported as a CSV file and saved for future trend and data analysis.

The "UNMS II" is offered in Basic and Advanced versions. Both versions perform the functionality noted above, with a few significant differences.

Basic Version: Can monitor up to (9) Trystar UPS's with NetMinder CS141 Ethernet adapters, from one device (e.g., desktop computer, tablet, laptop, or smartphone).

Advanced Version: Can monitor up to an unlimited number of UPS's, and has a customizable user interface screen which can be modified to reflect all of the UPS's and additional facility equipment being monitored.



Alarm and event notification via local and remote monitoring, e-mail, and cell phone text messaging.

MODEL SELECTION GUIDE

*All (13) models in the **HV Series** are packaged in either or both of two compact cabinets. We have developed custom outlet packages for any configuration necessary to deliver power to any equipment within the output voltage range of the model selected. This includes flush mounted, field wired, or sealed cable receptacles.*

MODEL SELECTION GUIDE

MODEL	kVA	WATTS	EXPANDABLE TO kVA	*FULL LOAD BATTERY RUNTIME	HALF LOAD BATTERY RUNTIME	**UNIT WEIGHT	CABINET SIZE	EFFICIENCY	BTU/HR	AUDIBLE NOISE
HV7500	7.5	5250	8.0	15 min.	35 min.	828 lbs.	B	92%	1432	50dB
HV8000	8.0	6000	9.0	13 min.	31 min.	828 lbs.	B	91%	1841	50dB
HV9000	9.0	7000	—	12 min.	26 min.	828 lbs.	B	91%	2148	52dB
HV10500	10.5	7500	11.5	12 min.	31 min.	956 lbs.	B	93%	1790	52dB
HV11500	11.5	8000	13.0	11 min.	27 min.	956 lbs.	B	92%	2182	52dB
HV13000	13.0	8500	—	9 min.	24 min.	956 lbs.	B	92%	2319	54dB
HV14000	14.0	10000	16.0	30 min.	66 min.	1715 lbs.	K	94%	2046	54dB
HV16000	16.0	12000	17.0	25 min.	57 min.	1715 lbs.	K	93%	2864	54dB
HV17000	17.0	14500	—	23 min.	54 min.	1715 lbs.	K	93%	3461	55dB
HV18000	18.0	16000	20.0	20 min.	46 min.	1835 lbs.	K	93%	3819	55dB
HV20000	20.0	18000	—	17 min.	41 min.	1835 lbs.	K	93%	4297	55dB
HV20000E	20.0	18000	25.0	15 min.	34 min.	2013 lbs.	B & K	93%	4297	55dB
HV25000	25.0	20000	—	11 min.	27 min.	2013 lbs.	B & K	93%	4774	55dB

* Maximum internal runtimes shown. Shorter internal and extended external runtimes available.

For models HV20000E and HV25000, batteries are in an external cabinet. Runtimes shown are typical.

** Add 50lbs. for total shipping weight.

EXPANDABILITY: Field expandability is a special feature of the **HV Series** UPS. The chart above indicates each model's level of expandability for future requirements.

CABINET SIZES: B = 21.5" W x 32" D x 44" H
K = 33.25" W x 35.75" D x 52.8" H

Where "Cabinet Size" indicates "B & K", both units are required.

INPUT VOLTAGES ACCEPTED BY THE HV SERIES

MODEL	INPUT VOLTS	AMPS	INPUT VOLTS	AMPS	INPUT VOLTS	AMPS
HV7500	120	66	208	38	240	33
HV8000	120	72	208	41	240	36
HV9000	120	84	208	48	240	41
HV10500	—	—	208	54	240	47
HV11500	—	—	208	49	240	51
HV13000	—	—	208	64	240	58
HV14000	—	—	208	72	240	62
HV16000	—	—	208	82	240	71
HV17000	—	—	208	87	240	79
HV18000	—	—	208	92	240	83
HV20000	—	—	208	103	240	90
HV20000E	—	—	208	103	240	90
HV25000	—	—	208	129	240	113

OUTPUT VOLTAGES ACCEPTED BY THE HV SERIES

MODEL	OUTPUT VOLTS	AMPS	OUTPUT VOLTS	AMPS
HV7500	240 / 120	31 / 62	208 / 120	36 / 62
HV8000	240 / 120	33 / 66	208 / 120	38 / 66
HV9000	240 / 120	38 / 76	208 / 120	43 / 76
HV10500	240 / 120	44 / 88	208 / 120	50 / 88
HV11500	240 / 120	48 / 96	208 / 120	55 / 96
HV13000	240 / 120	54 / 108	208 / 120	63 / 108
HV14000	240 / 120	58 / 116	208 / 120	67 / 116
HV16000	240 / 120	67 / 134	208 / 120	77 / 134
HV17000	240 / 120	71 / 142	208 / 120	82 / 142
HV18000	240 / 120	75 / 150	208 / 120	86 / 150
HV20000	240 / 120	83 / 166	208 / 120	96 / 166
HV20000E	240 / 120	83 / 166	208 / 120	96 / 166
HV25000	240 / 120	104 / 208	208 / 120	120 / 208

Battery

Runtime: Listed at full and half load for each model number with extended runtimes available. (See Model Selection Guide above)
Type: Sealed, maintenance-free, gas recombinant, self-venting, suspended electrolyte with no gel contaminant
Charger: 5 amp, two stage
Recharge Time: Typically 3 hours to full charge
Factory Tested: With specific inverter before shipping
Projected Life: 5 years service
Capacity: Batteries are sized with the inverter to support the load at rated kVA with a 0.7 power factor

Represented by:

TRYSTAR®

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