

## HV Series Uninterruptible Power Systems 7.5 KVA - 25 KVA

### General Specification

#### 1.0 General

This specification describes the features and design of the HV Series Uninterruptible Power System. The system is designed and manufactured to assure maximum reliability, serviceability and performance. The system is a line interactive UPS incorporating an IGBT based microprocessor controlled PWM inverter, high speed transfer SCR devices, constant voltage regulating transformer, battery charger and an energy storage battery platform. The UPS as specified herein provides complete load immunity from all line disturbances and power interruptions with no loss or disruption in AC output power. The system's constant voltage output transformer regenerates the output waveform during all phases of operation, thus maintaining a regulated, transient free power source for the intended load. A self-diagnostic monitoring system continuously advises of system status and battery condition.

#### 2.0 UPS Ratings

<u>Model</u>	<u>Ratings</u>	<u>Model</u>	<u>Ratings</u>
HV7500	7.5 KVA / 5.25 KW	HV14000	14.0 KVA / 10.0 KW
HV8000	8.0 KVA / 6.0 KW	HV16000	16.0 KVA / 12.0 KW
HV9000	9.0 KVA / 7.0 KW	HV17000	17.0 KVA / 14.5 KW
HV10500	10.5 KVA / 7.5 KW	HV18000	18.0 KVA / 16.0 KW
HV11500	11.5 KVA / 8.0 KW	HV20000	20.0 KVA / 18.0 KW
HV13000	13.0 KVA / 8.5 KW	HV25000	25.0 KVA / 20.0 KW

#### 3.0 Standards

The systems are designed in accordance with applicable portions of the following codes and standards:

- 3.1 American National Standards Institute (ANSI C57.110).
- 3.2 Institute of Electrical and Electronic Engineers (IEEE 519-1992) and (C62.41-1991).
- 3.3 National Electric Code (NEC) (NFPA 700).
- 3.4 National Electrical Manufacturers Association (NEMA PE-1).
- 3.5 Underwriters Laboratories (U/L 1778).
- 3.6 Federal Communications Commission (FCC Part 15, Sec. J, Class A).
- 3.7 Listed to U.L. Standards U.L.1778 and C-UL CSA C22.2 No. 107.1-21

#### 4.0 Input Specifications

- 4.1 Input Voltage: 208, 240, 277, 347 and 600 VAC.
- 4.2 Input Voltage Operating Range: +10% to -15% without battery usage.
- 4.3 Frequency Range: 57.5 Hz to 62.5 Hz.
- 4.4 Power Factor: Self correcting to >0.95.
- 4.5 Input Harmonics: <10% THD.
- 4.6 Input Voltage Spike Attenuation: 3000:1.

5.0 Output Specifications

- 5.1 Output Voltage: 208, 240/120, 277, 347 and 600 VAC.
- 5.2 Output Waveform: Maximum 3% harmonic distortion, any single harmonic.
- 5.3 Crest Factor: 3.5 to 1.
- 5.4 K Factor: 30 or better.
- 5.5 Power Factor: 0.7 switch mode rated.
- 5.6 Harmonic Attenuation: Reflected load generated harmonics are attenuated 23dB at the input.
- 5.7 Line Regulation: Typically better than  $\pm 3\%$ .
- 5.8 Load Regulation: Typically better than  $\pm 3\%$ .

6.0 Battery Specifications

- 6.1 Battery time: Based on full KVA load.
- 6.2 Battery Type: Sealed, maintenance free.
- 6.3 Battery Charger: 5 Amp., two stage, filtered 0.1%.
- 6.4 Recharge Time: Typically 10 times discharge time to full charge.
- 6.5 Buss Voltage: 96 VDC (7.5 – 13 KVA) or 120 VDC (14 – 20 KVA) or 144 VDC (20 – 25 KVA), Float 2.27 VPC, final 1.75 VPC.
- 6.6 Projected Life: 5 years service, 10 year design life.

7.0 Performance Specifications

- 7.1 Normal Operation: The load is supplied with regenerated, filtered and regulated utility power derived from the output constant voltage regulating transformer. When public utility AC power is present, the battery charger maintains a ripple free float charge on the batteries.
- 7.2 Uninterrupted Emergency Operation: Upon failure or unacceptable deviation of the utility AC power, energy will be supplied by the battery, converted to AC through the PWM inverter, regenerated, filtered and regulated through the system's constant voltage regulating output transformer, and continues to supply power to the load without interruption, loss or disturbance. When utility power is restored, the system reverts to normal operation without interruption, loss or disturbance.
- 7.3 Automatic Restart: In the case of a utility power outage that exceeds the battery time requirement, the output of the system will de-energize to protect the battery system, but automatically restarts once commercial AC power returns. When the utility power returns, recharging of the batteries commences immediately.
- 7.4 Overload Capability: 125% for ten minutes.
- 7.5 Surge Capability: 150% of rated output.
- 7.6 Frequency Stability:  $\pm 0.2$  Hertz.
- 7.7 Isolation: NEC article 250.20b, complies with this standard that specifies a separately derived power source.
- 7.8 Inner Winding Capacitance: 0.01 Picofarads.

7.9 Common Mode Noise Attenuation: 120 dB.

7.10 Transverse Mode Noise Attenuation: 70 dB (-3db at 1 kHz; -20 dB per decade).

7.11 Reactive Power Correction: Input power factor >.95 self correcting.

7.12 Expandability: HV7500, 7.5 KVA Models (Expandable to 9.0 KVA). HV10500, 10.5 KVA Models (Expandable to 13 KVA). HV14000, 14 KVA Models (Expandable to 17 KVA). HV18000, 18 KVA Models (Expandable to 20 KVA). HV20E, 20 KVA Models (Expandable to 25 KVA).

7.13 Efficiency, BTU/HR Emitted, Weight (without battery), Cabinet Sizes:

Model	Efficiency	BTU/HR	Weight	Dimensions W x D x H
HV7500	92%	1432	828 lb.	21.5" x 32" x 44"
HV8000	91%	1841	828 lb.	21.5" x 32" x 44"
HV900	91%	2148	828 lb.	21.5" x 32" x 44"
HV10500	93%	1790	872 lb.	21.5" x 32" x 44"
HV11500	92%	2182	956 lb.	21.5" x 32" x 44"
HV13000	92%	2319	956 lb.	21.5" x 32" x 44"
HV14000	94%	2046	1348 lb.	33.25" x 35.75" x 52.8"
HV16000	93%	2864	1348 lb.	33.25" x 35.75" x 52.8"
HV17000	93%	3461	1601 lb.	33.25" x 35.75" x 52.8"
HV18000	93%	3819	1631 lb.	33.25" x 35.75" x 52.8"
HV20000	93%	4297	1721 lb.	33.25" x 35.75" x 52.8"
HV20E	93%	4297	2013 lb.	33.25" x 35.75" x 52.8"
HV25000	93%	4774	2013 lb.	33.25" x 35.75" x 52.8"

8.0 Display Monitor and Diagnostics (Standard Monitoring Panel)

8.1 LED Display: Visual indication of system status including utility line power present, conditioned power on, battery charging and reserve battery power remaining (Battery Bar graph Indicator 10%-100%).

8.2 LED Alarm Panel: Visual and audible indication of general system status including on battery power, low battery, charger failure, high temperature and on bypass.

8.3 LED Shutdown Panel: Visual indication for battery discharged, remote emergency power off activated, Data Guard activated, Over temperature shutdown and manual restart required.

8.4 Keypad: Sealed, membrane keypad for audible alarm silence function and manual restart function.

9.0 Display Monitor and Diagnostics (Optional System Power Analyzer Monitoring Panel)

9.1 LCD Display: Backlit, 40 character alphanumeric LCD display for sharp visual resolution of data and titles. Displays data as selected by user keypad.

9.2 Keypad: Sealed, membrane keypad for user selection of monitored operating parameters, monitored alarm conditions, UPS system control settings, log functions and general operating controls.

9.3 Alarm Panel: Visual indication of general system status including UPS on status, on battery status and bypass status.

9.4 Measurements: AC input voltage, AC output voltage line to neutral, AC output voltage line to line, AC output current line one, AC output current line two, percent (%) load, current crest factor line one, current crest factor line two, DC charging voltage, DC charging current, output frequency, battery back up time remaining, load KW, Load KVA, Date and time.

9.5 Accuracy: True RMS measurements with 1% accuracy.

9.6 Log Functions: Automatically maintains the number of power outages, storing up to ten with time and date of each occurrence.

9.7 Alarm Messages: Low battery voltage warning, DC battery charger failure, over temperature warning, output overload warning.

#### 10.0 Communications Interface

10.1 Status / Alarm relay interface contacts provided for remote annunciation. Includes contacts for UPS on, utility failure, low battery warning, bypass on, general alarm.

10.2 Contacts rated for 24 VAC and/or 24 VDC, 500mA.

10.3 Power supply included for +5 VDC, 5mA with fully isolated logic ground. Ground connection fully isolated from internal battery and chassis ground.

10.4 RS232 communication port included for remote display of all locally monitored criteria.

#### 11.0 Environmental

11.1 Operating Temperature: 0°C (32°F) to 40°C (105°F).

11.2 Storage Temperature: -20°C to 50°C.

11.3 Relative Humidity: 95% non-condensed.

11.4 Elevation: 5,000 feet (1500 meters) above sea level without de-rating.

11.5 Audible Noise: 50 to 55 dBA.

11.6 NEMA 1 Enclosure

#### 12.0 Reliability

12.1 Total System: 100,000 hours.

12.2 Transformer: 200,000 hours.

12.3 Mean Time to Repair: Less than one hour.

#### 13.0 Standard Equipment

13.1 Thermal magnetic main input circuit breaker.

13.2 Standard internal or external battery platform.

13.3 Thermal magnetic D.C. circuit breaker and D.C. interconnect cable.

13.4 Provisions for hard wired input and output.

13.5 Copper conductor construction throughout entire system.

13.6 Provisions to add circuit breaker protected, flexible conduits with properly sized conductors and pre-installed receptacle and/or hard wired termination.

13.7 Provisions to add circuit breaker protected, flush mounted output receptacles.

13.8 Functional NEMA 1 Cabinet enclosure. Durable cabinet base substructure constructed using galvanized steel. Hinged doors and panels are constructed of steel. Cabinets are powder-coat painted off white, and include swiveling lockable casters.

14.0 Optional Equipment

14.1 Extended battery time.

14.2 Advanced System Power Analyzer display monitor with alarm panel.

14.3 Accelerated battery chargers.

14.4 Internal make before break maintenance bypass switch for use with UPS systems which include pre-installed output branch circuit breakers and/or flexible output cables.

14.5 External, wall mounted make before break maintenance bypass switch for use with UPS systems with hard wired output terminals and external dedicated UPS distribution panel board.

14.6 Preinstalled thermal magnetic output circuit breaker(s) for use with hard wired output termination (s).

14.7 Preinstalled thermal magnetic output circuit breaker(s) with flush mounted output receptacle(s).

14.8 Preinstalled thermal magnetic output circuit breaker(s) with flexible conduit and receptacle(s).

14.9 Input / bypass isolation transformer for systems which require 480 VAC or 600 VAC building input. Also used for make before break maintenance bypass circuit, voltage and phase matching.

14.10 Automatic message dialer.

14.11 Remote annunciator panel.

14.12 NetMinder Communications Module – External module with integrated webserver for remote monitoring of alarms via Ethernet TCP/IP, MODBUS TCP/IP, or MODBUS RS485.

14.12.1 BACnet communications over BACnet/IP or MS/TP network with the addition of customized external hardware.

14.12.2 Basic and Advanced versions of “UNMS II” (UPS Network Management System) software monitors multiple UPS’s from a single network device (computer, tablet, laptop, or smartphone).

14.13 NetMinder RCCMD client-side application software that performs an orderly, unattended shutdown of customer file servers.

14.14 Communication port 4X and/or 7X expander options.

15.0 Warranty

15.1 All systems are guaranteed to be free from defects in material and workmanship for a period 1 year following delivery.

15.2 Batteries are warranted with a 1 year full replacement warranty and an optional 4 year pro-rate with applicable maintenance contract.

15.3 Optional, extended warranty and maintenance contracts available.