Product Specification

Models:
SCV-10001, SCV-10002
SCV-15001, SCV-15002
SCV-20001, SCV-20002
SCV-30001, SCV-30002
and
LB Extended Run Time Models

Guide Specification for UniStar® V Series

Universal Tower/Rack 1, 1.5, 2, 3kVA Single-Phase, On-Line Double Conversion Uninterruptible Power Supply

11-30-16

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SECTION 1.0
SCOPE AND SYSTEMS RATINGS

1.1 Specification

This specification defines the electrical and mechanical characteristics and requirements for a continuous duty, single-phase, rack and universal mount design uninterruptible power system. The specification identifies 1kVA, 1.5kVA, 2kVA and 3kVA double conversion equipment, hereafter referred to as the UPS.

The UPS shall utilize "true on-line" pulse width modulated (PWM) inverter incorporating Mosfet Transistor technology. The inverter is a microprocessor controlled, solid-state device within the uninterruptible power system. The uninterruptible power system, hereafter referred to as the UPS, shall provide high quality AC power for sensitive electronic equipment loads.

The UPS shall consist of a rectifier/charger, battery, inverter, protective devices, static transfer switch, synchronizing and phase lock circuitry, and controls required to provide regulated, uninterrupted, conditioned power to the critical load.

The UPS shall include all mechanical and electrical devices that will automatically provide continuity of electrical power within the defined limits without interruption, failure or degradation of the commercial power source. Continuity of conditioned electric power shall be maintained for the defined period of time by the battery system. Upon return of the utility power source, the UPS shall automatically assume the load, while simultaneously recharging the batteries.

1.2 UPS Modes of Operation

The UPS shall be designed to operate as an on-line reverse transfer system in following modes:

1.2.1 Normal: The critical AC load is supplied continuously by the inverter. The rectifier/charger derives power from a utility AC source and supplies DC power to the inverter while simultaneously float charging a battery system. The inverter converts the DC power into clean and regulated AC power that is then supplied to the critical load through the static transfer switch.

1.2.2 Emergency: Upon failure or degradation of the utility AC power, the critical AC load supplied by the inverter will draw its power from the batteries. There shall be no interruption of power switching from utility AC power to batteries or while switching from batteries back to utility AC power upon its restoration. While the battery powers the UPS, indication for actual battery backup time shall be provided.

1.2.3 Recharge: Upon restoration of utility AC power, even if the batteries are completely discharged, the UPS will restart. The rectifier/charger shall assume the inverter and battery recharge loads. If the bypass source is within acceptable limits, the UPS will retransfer the critical load back to the inverter.

1.2.4 Bypass: When the inverter overload capacity is exceeded, the static transfer switch shall perform a transfer of the load from the inverter to the bypass source with no interruption in power to the critical load.

1.2.5 Maintenance Bypass: If for some reason the UPS has to be taken out of service for maintenance or repair, the UPS shall be provided with an optional, external maintenance bypass switch to enable a load transfer from the inverter to the bypass source with no interruption of power to the critical load.

1.3 System Ratings

Ratings	**120Vac**	**230Vac**
Voltage Range	55Vac –150Vac, +/- 5%	110Vac – 300Vac, +/- 5%
Frequency Range	40Hz – 70Hz	
Frequency	50/60 Hz Auto-Select, +/- 5Hz	
Phase/Wire	Line + Ground	
Power Factor	>0.99 at nominal voltage (100% Load)	
Transfer Time	0 ms	
AC Leakage Current	< 5mA |	<3.5mA
Surge Protection	400 joules |	300 joules

1.3.2 Output

Capacity	1kVA/900W **|**	1.5kVA/1350W **|**	2kVA/1800W **|**	3kVA/2700W
Voltage	120Vac **|**	230Vac		
Voltage Regulation	+/- 1%			
Frequency (Sync Range)	47 – 53Hz or 57 - 63Hz			
Frequency Range (Battery Mode)	50Hz +/- 0.5% or 60Hz +/- 0.5%			
Crest Factor Ratio	5:1			
Harmonic Distortion	< 2% THD (Linear Loads), < 8% THD (Battery Mode)			
Transient Response	< = 60ms/5%			
Waveform	Pure Sine Wave			
Efficiency AC Mode	1kVA 86%/88% peak	2 & 3kVA 88%/90% peak		
Efficiency Bat. Mode	1kVA 83%/86% peak	2 & 3kVA 85%/ 85% peak		
DC Start	Yes			
Cooling	Load Dependent Variable Speed Fans			
Over temperature	Normal Mode – Transfer to bypass; Battery Mode – UPS shuts down immediately			
Overload	<105% continuous, >120% for 30 seconds, >150% for 10 seconds			

Full Load Heat	**1kVA**	**1.5kVA**	**2kVA**	**3kVA**
Rejection BTU/hr	359	539	719	1,078

1.3.3 Internal Battery

Internal battery shall be maintenance-free sealed type to minimize the need for servicing. Battery shall be hot-swappable design, allowing users to replace the batteries without the hazard of electrical shock or interruption to the connected load. The UPS shall continue to supply power during such servicing, as applicable.

Model	**1kVA/1.5kVA/2kVA/3kVA**
Internal Battery Run Time @Full Load (Minutes)	2.7

	1kVA	**1.5kVA**	**2kVA**	**3kVA**
Battery	2 ea.12V/9AH	3 ea.12V/9AH	4 ea.12V/9AH	6 ea.12V/9AH
Type	Maintenance Free Cell - VRLA Lead Acid			
Charging Current	120Vac - 1.0 Amps		230Vac 6 Amps	

	1kVA	**1.5kVA**	**2kVA**	**3kVA**
Charging Voltage	27.4Vdc	41.1Vdc	54.7Vdc	82.1Vdc
	+/-0.1%			
Hot – Swappable	Yes			
Recharge Time (Typical)	4 hours to 90%			
Extended Battery	Yes – Hot Swappable			
DC Linkage Current	<30uA (+/-10uA) with no AC applied and unit Off			
Battery Mgmt.	Automatic Battery Management (ABM) saves battery life			

SECTION 2.0
ENVIRONMENTAL

2.1 Environmental

Operating Temp:	32ºF / 0°C – 104ºF / 40°C
*Storage Temp:	-13ºF / -25ºC – 122ºF / 40ºC (“-LB Units -13ºF / -25ºC – 122ºF / 60ºC”)
Altitude:	0 - 2,000 m up to 40° C
Noise Level:	<50dBA @ 1 Meter
Relative Humidity:	0 to 90% non-condensing

***Battery Packs, “BAT” & Units with internal batteries require refresh charing every 3 month @ 104ºF [40ºC]**

SECTION 3.0
GENERAL REQUIREMENTS

3.1 System Description

3.1.1 Rectifier/Charger

The rectifier section of the power converter module capable of receiving utility input and rectifying it to produce Direct Current (DC) power at levels sufficient enough to supply the load via the inverter, and recharge the battery.

3.1.2 Inverter

The inverter section of the power converter module shall utilize power switching Mosfet Transistors. This solid-state device that incorporates pulse width modulation (PWM) technology is capable of accepting the output of the rectifier/charger or the battery system voltage and delivering AC power within specified limits to the critical load bus. The inverter shall be microprocessor controlled and include all necessary timing logic and control circuits.

3.1.3 Static Transfer Switch

An internally mounted static transfer switch and bypass circuit shall be provided as an integral part of the UPS. The static switch shall be high speed power electronic devices rated to conduct full load current continuously while on inverter or bypass power. The static switch shall include all necessary logic circuitry for fully automatic frequency synchronization and phase locking of the UPS inverter output to the bypass/reserve power source.

SECTION 4.0
WIRING AND CONNECTION

Wiring practices, materials and coding shall be in accordance with the requirements of the National Electric Code, NFPA 70 and other applicable codes and standards

Section 4.1 Description

4.1.A Standard Model Input/Output Connections

kVA	Vac	Input Cord	Output Connection
1	120	5-15P	(4) 5-15R
1.5	120	5-15P	(4) 5-15R
2	120	5-20P	(8) 5-20R
3	120	L5-30P	(4) 5-20R (1) L5-30R
1	230	(10A) IEC320-C14	(8) 10A IEC320-C13
1.5	230	(10A) IEC320-C14	(8) 10A IEC320-C13
2	230	(16A) IEC320-C20	(8) 10A IEC320-C13
3	230	(16A) IEC320-C20	(6) 10A IEC320-C13 (1) – C20

Output Control: (2) ON/OFF Software controlled receptacle banks for load shedding.

4.1.B Standard Battery

A storage battery shall be used to provide the system with extended operational run times. Battery shall be hot-swappable design, allowing users to replace the batteries without the hazard of electrical shock or interruption to the connected load . The UPS shall continue to supply power during such servicing, as applicable. Battery run times shall be as follows (minutes):

UPS Rating	Part Number	Quantity Cabinets	# Strings Internal/ External	25% Load	50% Load	75% Load	100% Load	Rack Mount *Dimensions H" x W" x D" / [mm]	*Wt. lbs. / (kg)
I kVA	Internal	0	1/0	25	10	5	2.7	N/A	N/A
	SCV-BAT-1K	1	1/2		40	25	18	3.39" x 17.24" x 17.04" (2U) [86.2 x 438.0 x 432.7]	38 / (17)
1.5kVA	Internal	0	1/0	25	10	5	2.7		
	SCV-BAT-1.5K	1	1/2		40	17	18	3.39" x 17.24" x 20.97" (2U) [86.2 x 438.0 x 532.7]	55 / (25)
2kVA	Internal	0	1/0	25	10	5	2.7		
	SCV-BAT-2K	1	1/2		40	17	18	3.39" x 17.24" x 20.97" (2U) [86.2 x 438.0 x 532.7]	64 / (29)
3kVA	Internal	0	1/0	25	10	5	2.7		
	SCV-BAT-3K	1	1/2		40	25	18	3.39" x 17.24" x 25.70" (2U) [86.2 x 438.0 x 652.7]	91 / (41)

*For the most current dimensions and weight, always refer to the spec control drawing.

4.1.C Extended Run Time Models

An Extended Run Time Model (LB) shall be available when the required standard model does not provide the required battery back up time with one(1) Battery Cabinet. The LB Modle shall be without internal batteries and shall meet the same electrical characteristics as the Standard Model.

Extended Run Time Battery Cabinets shall accept 1 to 8 Strings of batteries per the chart as follows:

Extended Battery Run Time Chart - Minutes
For UniStar V Series, LB Rack Mount Models, 1kVA, 1.5kVA, 2kVA & 3kVA

UPS Rating	Part Number	Quantity Cabinets	# Strings	25% Load	50% Load	75% Load	100% Load	Rack Mount *Dimensions H" x W" x D" / [mm]	*Wt. lbs. / (kg)
(2) HR1251W Batteries per string									
1kVA	**SCV-BAT-51-1K-1**	1	1	45	19	11	7	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	55 / (25)
	SCV-BAT-51-1K-2	1	2		45	28	19		71 / (32)
	SCV-BAT-51-1K-3	1	3		76	45	32		88 / (40)
	SCV-BAT-51-1K-4	1	4			63	45		104 / (47)
	SCV-BAT-51-1K-5	1	5				58		120 / (54)
	SCV-BAT-51-1K-6	1	6				76		136 / (62)
	SCV-BAT-51-1K-7	1	7				100		152 / (69)
	SCV-BAT-51-1K-8	1	8				122		169 / (77)
(2) HR1290W Batteries per string									
1kVA	**SCV-BAT-90-1K-1**	1	1	95	38	22	16	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	69 / (31)
	SCV-BAT-90-1K-2	1	2	217	95	55	38		100 / (45)
	SCV-BAT-90-1K-3	1	3	332	157	95	65		130 / (59)
	SCV-BAT-90-1K-4	1	4	457	217	136	95		160 / (73)
	SCV-BAT-90-1K-5	1	5	600	275	177	126		190 / (86)
(2) HR12150W Batteries per string									
1kVA	**SCV-BAT-150-1K-1**	1	1	209	91	55	38	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	90 / (41)
	SCV-BAT-150-1K-2	1	2		209	129	91		141 / (64)
	SCV-BAT-150-1K-3	1	3		345	209	148		193 / (88)

Continued Next Page

Extended Battery Run Time Chart – Minutes Continued…
For UniStar V Series, LB Rack Mount Models, 1kVA, 1.5kVA, 2kVA & 3kVA

UPS Rating	Part Number	Quantity Cabinets	# Strings	25% Load	50% Load	75% Load	100% Load	Rack Mount *Dimensions H" x W" x D" / [mm]	*Wt. lbs. / (kg)
(2) HR1251W Batteries per string									
1.5kVA	**SCV-BAT-51-1K-1**	1	1					8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	
	SCV-BAT-51-1K-2	1	2						
	SCV-BAT-51-1K-3	1	3						
	SCV-BAT-51-1K-4	1	4						
	SCV-BAT-51-1K-5	1	5						
	SCV-BAT-51-1K-6	1	6						
	SCV-BAT-51-1K-7	1	7						
	SCV-BAT-51-1K-8	1	8						
(2) HR1290W Batteries per string									
1.5kVA	**SCV-BAT-90-1K-1**	1	1					8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	
	SCV-BAT-90-1K-2	1	2						
	SCV-BAT-90-1K-3	1	3						
	SCV-BAT-90-1K-4	1	4						
	SCV-BAT-90-1K-5	1	5						
(2) HR12150W Batteries per string									
1.5kVA	**SCV-BAT-150-1K-1**	1	1					8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	
	SCV-BAT-150-1K-2	1	2						
	SCV-BAT-150-1K-3	1	3						
(4) HR1251W Batteries per string									
2kVA	**SCV-BAT-51-2K-1**	1	1	45	19	11	7	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	71 / (32)
	SCV-BAT-51-2K-2	1	2		45	28	19		104 / (47)
	SCV-BAT-51-2K-3	1	3		76	45	32		136 / (62)
	SCV-BAT-51-2K-4	1	4			63	45		169 / (77)
(4) HR1290W Batteries per string									
2kVA	**SCV-BAT-90-2K-1**	1	1	95	38	22	16	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	100 / (45)
	SCV-BAT-90-2K-2	1	2	217	95	55	38		160 / (73)
	SCV-BAT-90-2K-2	2	4	457	217	136	95	17.44" x 19.00" x 22.94" (10U) [443.0 x 482.6 x 582.5]	320 / (146)
	SCV-BAT-90-2K-2	3	6		332	217	157	26.16" x 19.00" x 22.94" (15U) [664.5 x 482.6 x 582.5]	480 / (219)
(4) HR12150W Batteries per string									
2kVA	**SCV-BAT-150-2K-1**	1	1	209	91	55	38	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	141 / (64)
	SCV-BAT-150-2K-1	2	2		209	129	91	17.44" x 19.00" x 22.94" (10U) [443.0 x 482.6 x 582.5]	282 / (128)
	SCV-BAT-150-2K-1	3	3				345	26.16" x 19.00" x 22.94" (15U) [664.5 x 482.6 x 582.5]	423 / (192)
(6) HR1251W Batteies per string									
3kVA	**SCV-BAT-51-3K-1**	1	1	45	19	11	7	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	88 / (40)
	SCV-BAT-51-3K-2	1	2		45	28	19		136 / (62)
	SCV-BAT-51-3K-2	2	4			63	45	17.44" x 19.00" x 22.94" (10U) [443.0 x 482.6 x 582.5]	272 / (124)
	SCV-BAT-51-3K-2	3	6				76	26.16" x 19.00" x 22.94" (15U) [664.5 x 482.6 x 582.5]	408 / (186)
(6) HR12150W Batteries per string									
3kVA	**SCV-BAT-150-3K-1**	1	1	209	91	55	38	8.72" x 19.00" x 22.94"(5U) [221.5 x 482.6 x 582.5]	193 / (88)
	SCV-BAT-150-3K-1	2	2		209	129	91	17.44" x 19.00" x 22.94" (10U) [443.0 x 482.6 x 582.5]	386 / (176)
	SCV-BAT-150-3K-1	3	3		345	209	148	26.16" x 19.00" x 22.94" (15U) [664.5 x 482.6 x 582.5]	579 / (264)

*For the most current dimensions and weight, always refer to the spec control drawing.

SECTION 5.0
MECHANICAL STANDARDS

5.1 Cabinet Description

The UPS unit, comprised of the rectifier/charger, inverter, static transfer switch shall be housed in an enclosure offering indoor protection.

*Dimensions	1kVA	1.5kVA	2kVA	3kVA
Rack Configuration H" x W" x D" [mm]	3.39" x 17.24" x 16.44" [86.2 x 438.0 x 417.5]	3.39" x 17.24" x 20.38" [86.2 x 438.0 x 517.5]	3.39" x 17.24" x 20.38" [86.2 x 438.0 x 517.5]	3.39" x 17.24" x 25.10" [86.2 x 438.0 x 637.5]
Tower Configuration H" x W" x D" [mm]	17.24" x 3.39" x 16.44" [438.0 x 86.2 x 417.5]	17.24" x 3.39" x 20.38" [438.0 x 86.2 x 517.5]	17.24" x 3.39" x 20.38" [438.0 x 86.2 x 517.5]	17.24" x 3.39" x 25.10" [438.0 x 86.2 x 637.5]
Weight lbs. / [kg]	29 / [13]	42 / [19]	47 / [21]	65 / [29]

*For the most current dimensions and weight, always refer to the spec control drawing.

SECTION 6.0
MONITORING, CONTROLS, ALARMS AND COMMUNICATION

6.1 General

6.1.1 Control Panel

The UPS unit shall incorporate the necessary controls, instruments and indicators to allow the operator to monitor the system status and performance, as well as take any appropriate action.

Display, Alarms, Diagnostics, Communications & Emergency Functions

Status On LCD	Load Information: Indicates the Load Level by 0-25%, 26-50%, 51-75% and 76-100%, Low Battery and Battery Good, Programmable Management Outlets are working, UPS ON-LINE, UPS working in Frequency Converter Mode, UPS ON BYPASS, Alarm Disabled indicator and Battery Charger Working.
Readings On LCD	Input Voltage, Input Frequency, Output Voltage, Output Frequency, Battery Backup Time Hours/Minutes, Fault indicator, Battery Voltage, Overload, Load and/or UPS Output is short circuited.
Select Buttons	OFF/ENTER: Turn UPS OFF, Switch LCD Message, Setting Mode and Down Select Key.
On/Mute + Select Button	Switch to Bypass Mode

Audible Alarms And Visual	Battery Low, Overload, Battery not connected, Overcharge, Site Wiring Fault, EPO Enabled, Over Temperature, Charger Failure, Battery Fault, Bypass Out of Range, Bypass Frequency Unstable.

6.1.2 Communications

The UPS shall have the following as standard with (1) open card slot.

A. The communication port on the rear panel of the UPS shall be RS232 serial type and USB Port, allowing for computer connection to monitor the status of the UPS, and allow for the control and operation of the UPS. Communication software will bundled with the UPS for use with MS Windows.

B. Eergency Power Off shuts down UPS when activated by (EPO) Connection for customer supplied EPO Circuit.

Section 7.0
STANDARDS

7.1 Applicable Documents

The UPS shall be designed in accordance with the applicable sections of the current revision of the following documents.

Safety/Performance	1, 1.5, 2 & 3kva 120V Model: UL1778/cUL 1, 1.5 & 2 kva 230V Models: CE 3kva 230V Model: UL1778/cUL/CE

IEC/EN 62040-1-1, IEC 60950-1, IEC/EN 62040-2 Class A, FCC Part 15 Subpart B Class A.

EMC Standards	IEC/EN62040-2 Class A, FCC Part 15 Subpart B Class A, IEC/EN55011, CISPR11, IEC61000-4-2/-3/-4/-5, IEC61000-2-2, IEC61000-3-2/-3

SECTION 8.0
OPTIONS

8.1 Maintenance Bypass Module

The manually operated, external Maintenance Bypass Module shall be make-bfore-break and provide for continuous power to the critical load, when maintenance procedures are necessary, for either scheduled or unscheduled events. The Ratings shall be as follows:

KVA/Rating/Voltage	Input Connection	Output Receptacles
*1kVA / 120V	Attached 6' Cord with 5-15P	(4) 5-15R
2kVA / 120V	Attached 6' Cord with 5-20P	(8) 5-20R
3kVA / 120V	Attached 6' Cord with L5-30P	(4) 5-20R & (1) L5-30R
1kVA & 2kVA/230V	Attached 6' Cord with IEC C14	(8) IEC C13
3kVA / 230V	Attached 6' Cord with IEC C20	(6) IEC C13 & (1) IEC C19

Dimensions: 3.5"H x (2U) x 17.3"W x 3.0"D

***1.5kVA / 120V V can use 1kVA Maintenance Bypass Module.**

8.2 Communications

The UPS shall have (1) available card slot to receive an optional:

A. Internal SNMP Card includes adapter card, MIB software, interface cable and operators manual. Support HP Open View, Sun SunNet Manager, IBM NetView, Novell NMS, Accton AccView and other SNMP Compliant NMS's.

B. Modbus Card

C. AS400 Card with DB9 Connector

D. AS400 Card with 9 Pin Connector

SECTION 9.0
FACTORY TESTING

9.0 Factory Testing

Before shipment, the manufacturer shall completely test the system to factory standards to assure compliance with the specification.

SECTION 10.0
INSTALLATION AND OPERATION DATA

10.1 Operating and Maintenance Manuals

The specified UPS system shall be supplied with one copy of the User's Manual. Additional copies may be downloaded from manufacturers web site or ordered at an additional charge from the manufacturer.

SECTION 11.0
LIMITED WARRANTY

11.1 UPS and Battery Limited Warranty

The UPS Electronics Module with depot repair warranty shall be in effect for 36 months from date of invoice. The battery shall provide for a one (1) Full Year Warranty, 4 Year pro-rated.

SECTION 12.0
QUALIFYING EXPERIENCE

12.0 Qualifying Experience

The manufacturer shall have a minimum of ten years experience in the design, manufacture, and testing UPS systems. This specification outlines the minimum requirements for a UPS. Every supplier shall provide a specification compliance statement with its proposal referencing each section of this specification.

12.1 Approved Manufacturer

Staco Energy Products Company
301 Gaddis Blvd
Dayton, Ohio 45403
www.stacoenergy.com
(866) 216-1191 Fax (937) 253-1723