PKG-ML- 143

USER'S MANUAL (IFU)

Su-Kam
powered by innovation

TRIPLE CONVERSION ONLINE UPS
1000VA / 24V

Salient features

- DSC based High frequency design using latest IGBTs
- Triple Conversion Voltage/Frequency Independent technology
- 18 KHz PWM sine-wave topology
- Active Input power factor correction with lower pollution to the power grid
- Reduced hardware hence increased reliability
- Higher efficiency
- Extended battery life with Pure DC Charger
- High crest factor handling all high-inrush current loads

GLOBAL CERTIFICATIONS:

ISO 9001 : 2000
ISO 14001:2004

R&D Recognised by GOVERNMENT OF INDIA MINISTRY OF SCIENCE & TECHNOLOGY

Before connecting, operating, or adjusting this unit, please read this instruction booklet carefully .

Customer care: +91 - 11 - 44231111

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1.1 Introduction

Thank you for selecting Uninterruptible Power Supply (UPS) of Su-Kam as your power protection system. ISO 9001 certification represents Su-Kam's commitment to building world-class products. We take pride in every unit that leaves our manufacturing facility.

Su-kam's Uninterruptible Power Supply (UPS) Systems supply No-break, clean & perpetual Power to loads. UPS is connected between the Mains or Utility Power and the Load (e.g.: PC).

It protects the Load against Mains disturbances like Blackout, Brownouts, Sags & Surges, Voltage variations and Fluctuations, Frequency variations, Spikes, Distortion and Noise. This UPS model is a Triple Conversion True Uninterruptible Power Supply with stable power, best suited for your critical load.

Rest Assured! You have chosen highly dependable UPS with numerous stunning features.

Main Applications of Online UPS

- Computers: like, Workstations, Servers, Data Centers, Plotters, Monitors and Modems
- Telecommunications/Communications
- Medical equipments
- Printing & Media equipments
- Point of sale
- Video & sound equipments
- Small Automation control equipments
- Security equipments
- Sensitive electronics or any other computerized systems

1.2 Important Safety Instructions

Before proceeding further kindly go through the safety instructions carefully.

General Precautions:

- Before using the Online UPS read all instructions, cautionary markings on the UPS, the Batteries and all appropriate section of this instruction manual carefully.
- Do not expose the UPS to rain, direct sunlight, dust, corrosive and overheating surrounding, and liquids of any type. The UPS is designed for interiors only. The surrounding temperature should be 0-35°C and humidity of 30% to 90% (non-condensing).
- Do not dis assemble the UPS; take it to a Su-Kam Engineering Service Centre when service or repair is required. Opening by unqualified personnel entails electric shock or fire hazard.
- To reduce risk of electric shock, disconnect all wiring before cleaning.
- Warning- Risk of Explosive gases

  WORKING IN THE VICINITY OF A LEAD ACID BATTERY MAY BE DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL OPERATION.
- Provide ventilation to outdoors form the battery compartment. The battery enclosures should be designed to prevent accumulation and concentration of hydrogen gas in "pockets" at the top of the compartment. Vent the battery compartment from the highest point. A sloped lid can also be used to direct the flow to the vent opening location.
- To reduce the risk of battery explosion, follow all instructions of battery suppliers or any equipment you intend to use in the vicinity of batteries.
- If the batteries are not used for any length of time, they will discharge naturally. Batteries should be recharged if not used for a specified time otherwise warranty will be cancelled. While in installed and running condition, the batteries are recharged automatically.

- Do not cover the UPS with any cover or cloth. Keep it 10-12 inches away from wall. Do not install this UPS on or near flammable materials (plywood, chemicals, gasoline etc.).
- Be extra cautious when working with metal tools on and around batteries. It could short-circuit the batteries or other electrical parts, producing a spark that could cause an explosion.
- Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce Short-Circuit current high enough to weld a ring or the like, causing severe burns.

Important Precautions

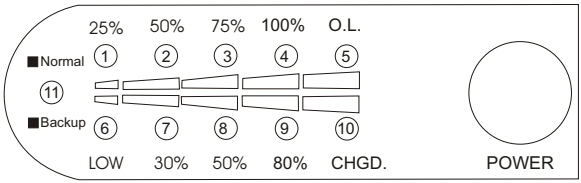
- The output side of the UPS AC wiring should never be connected to a generator or incoming utility power. This condition is far worse than a short circuit. If the unit survives this condition, it will shut down until correction is made.
- Note: Never disconnect the battery cables while the UPS is delivering power or battery charger is operating. The UPS active switch has no effect on the charger; it turns off the Output of the UPS. To disconnect the batteries for service (a) turn off the UPS through UPS active switch (b) disconnect all AC power, (c) disconnect all the battery cables. Keep unauthorized personnel away from the system.
- Being Class-A UPS product, the user may be required to take additional measures as this product may cause radio interference in domestic environment.

1.3 The Advanced Characteristics

- Digital Signal Controller based High frequency design using latest IGBTs, guarantees high reliability.
- Triple Conversion Voltage/ Frequency independent technology.
- Online architecture with a stable, regulated, transient-free pure sine-wave AC Power.
- 18 KHz PWM sine-wave topology yields an excellent overall performance.
- High input power factor with lower pollution to the power grid.
- A boost-flyback converter with active input current shaping technique is used for PF control and DC voltage fast regulation
- Reduced hardware hence increased reliability.
- Higher efficiency.
- Wide input voltage range minimizes battery usage and enhances battery utilization & life.
- Noiseless operation.
- Light weight and compact in design resulting into reduced freight cost and space saving.
- Pure DC charger with extended power resulting in extended battery life and lower maintenance cost.
- The high crest factor of the inverter handles all high-inrush current loads without a need to upgrade the power rating.

- Future upgradeability through digital flash memory.
- Multiple protection features like input under/over voltage, frequency variation, pulse by pulse current limiting, over temperature, overload, short-circuit and surge protection, ensure load safety.
- DC-start function makes sure of the start-up of UPS during power outages.
- Advanced thermal management through thermistor as temperature sensor.
- User friendly LED display.

1.4 Front View



On the front panel of the UPS there is a On/Off switch and a LED display for indications.

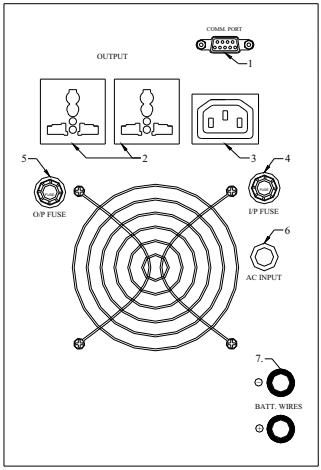
On/Off switch : This is a non latching On/Off reset switch. When pressed, on second beep (first beep in case of mains present), the output turns on.

LED indications on Online UPS

INDICATION	DESCRIPTION
NORMAL	LED11: This LED, when *green*, shows that the incoming mains is available.
BACKUP	LED11: This LED, when *red*, shows that the incoming mains is not available and the system is in backup mode
LOAD	LED1, LED2, LED3, LED4: These *green* LEDs glows when the load is 25%,50%, 75%& 100% respectively
OVERLOAD	LED5: This *red* LED shows that the UPS is overloaded and buzzer gives intermittent beep. If overload continues even after specified time, UPS turns off permanently and buzzer gives continuous beep.

INDICATION	DESCRIPTION
BATTERY LOW	LED 6: This *red* LED shows that battery voltage has gone down to a low limit during discharge. The buzzer gives intermittent beeps. With indication UPS will shut down automatically after a few minutes. After shutdown this LED glows and the buzzer gives continuous beep.
BATTERY CHARGED	LED7, LED8, LED9, LED10: These *green* LEDs glow when the battery is charged up to 30%, 50%, 80%& Charged respectively.

1.5 Rear View



INDICATION	DESCRIPTION
1.	Communication Port RS 232.
2.	2X6A, 250V Universal Output socket.
3.	D-type 6A,250V Output socket.
4.	Input Fuse,10A,250V (slow blow)
5.	Output Fuse,10A,250V (slow blow)
6.	AC Input, 16A, 250V.
7.	Battery Wires (red: Positive; black: negative) 16 sq mm.

2.1 Installation & Operation

Do not try to install the UPS system yourself. A qualified engineer from Su-Kam will be deputed for installation and commissioning of the UPS Systems. Any tampering or shifting or unauthorized addition of load after the installation annuls warranty. Strictly follow the operating instructions given in the manual.

Unpacking and Inspection

While unpacking a brand new UPS system, check for the following:

1. The condition of the packing box.
2. The UPS Box contains Warranty Card & Product Manual.
3. Check for the physical damages occurred during transit, if any.

Keep safe all the packing material until the inspection & installation is complete.

Pre-Check & Commissioning

The installation work should be carried out under the supervision of a qualified engineer from Su-Kam. The customer should provide all necessary material handling equipments, hand tools and labour including an electrician.

Battery Bank Connections

Install batteries in the Battery Cabinet/Stand. Measure the individual battery voltages. (should be 12V - 13V) and connect all the batteries in series. All batteries should be in equalized charge state. The total battery bank should be as per UPS DC bus design. Check and tighten all the battery connections. Apply white petroleum jelly on the terminals to avoid corrosion.

Attention:

User must exercise due caution while using the batteries. Please ensure that instructions laid down by battery manufacturers are followed properly. Improper use and carelessness in handling batteries can be hazardous and the company does not take any responsibility for any accidents/damages arising out of the same.

After Unpacking & Inspection, follow the simple Installation procedure:

1. Check the I/P Earth to Neutral voltage. It should be less than 5V.
2. Connect the UPS to Utility Mains.
3. Switch on the mains power & measure the DC voltage at battery terminal. If OK, press the switch to switch-on the UPS and measure the UPS output voltage. If OK, switch-off the UPS by UPS active switch by pressing it again.
4. Check the battery type & note the Battery AH.
5. Connect the batteries in series and make the DC bank.
6. Connect the Battery Bank to the UPS (confirm polarity at terminals).
7. Allow batteries to charge for ~ 12 hours before its first use.
8. Once battery charging is over, switch ON the UPS.
9. Load the UPS gradually.
10. Switch off the Mains Power & allow the UPS to be with batteries for some time.
11. Switch on the Mains Power.

Congratulations! You have successfully installed the UPS.

Storage Instructions

To prolong the battery life and proper functioning of UPS system, maintain the surrounding temperature at 25°C to 35°C.

Charge the battery for at least 12 hrs every three months (2 months is necessary if in high temperature area)

Site Preparation

The UPS system should be installed in a clear, well-ventilated room with adequate space for movement of personnel for servicing whenever required. There should be a clear space of minimum 2 feet around the UPS.

The customer should provide the following facilities:

230V, 1-Phase 3-wire, 50Hz power outlet of adequate capacity with an independent switch fuse unit or MCBs for powering the UPS system in the room at a convenient point and this should be easily accessible.

A load distribution panel for connecting the various computer/Loads. This Board should have one SPN (isolator) of adequate rating, feeding individual loads with separate MCB of adequate rating to enable any load to be isolated in case of branch faults. The output of UPS is fed to the main isolator and distributed to individual loads through the branch circuit MCB.

3 core PVC insulated copper cable is required for connecting the UPS output to the load Distribution Panel.

A 2 core PVC insulated cables of proper gauge is required for connecting the battery bank to the UPS system. All the cables of proper gauge are required for connecting the Battery Bank to the UPS system. All the cable required for making the above connection has to be arranged by the customer unless Su-Kam has specifically agreed to supply the same.

SMF / flooded lead acid Battery Bank can be used for backup power, it can be placed in the same room as the UPS inside suitable acid resistant battery cabinet / rugged plastic trolley.

Cable Requirement:

Earthing Requirement

i) The UPS cabinet should be earthed to prevent any shock hazards due to leakage current.

ii) All connected loads are to be earthed to output earth terminal.

2.2 Preventive Maintenance

To get long trouble free service with UPS System, the frequent maintenance of UPS as well as batteries is required.

Read Important Safety Instructions before attempting any maintenance of UPS System.

UPS Maintenance:

Switch off UPS through front switch and disconnect the Mains I/P supply to UPS.

Ensure the following:

i) Proper ventilation of site.
ii) Premises are dry and clear.
iii) No loose contacts anywhere in the utility output powering the UPS.
iv) UPS is not overloaded.
v) Clean the panel at least once in 30 days with a dry cotton cloth.

Battery Maintenance:

Switch off UPS through front switch and disconnect the Mains I/P supply to UPS.

i) Check if all the connections are tight.
ii) If loose, tighten the same with insulated spanner.
iii) Remove the dirt/dust from terminals.
iv) Clean the terminal with a dry cloth.
v) Apply petroleum jelly/Vaseline.
vi) Check the individual Battery Voltage with multi-meter. All batteries should be in equalized charge state.

For Lead Acid Battery use the following additional steps:

i) Avoid naked light in battery room.
ii) Check the battery level at least once in 60 days.
iii) Use only PVC mug for topping up.
iv) Always use distilled water for topping up.
v) Topping should be done before charging or early part of charger cycle.
vi) Check & record individual battery voltages. All batteries should be in equalized charge state.

3 Trouble shooting

Problem	Possible Cause(s)	Action Recommended
UPS system works on battery when Mains is present	1. Input connecting wire may be loose. 2. Mains may be low/ high or frequency is out of range. 3. UPS is defective.	Check the wiring. Check I/P Fuse. Call engineer.
No Battery backup or less battery backup	1. Connecting wires may be loose. 2. Batteries of battery bank may be defective. 3. Charger section of UPS. may be defective.	Check the wiring of batteries. Call engineer. Call engineer.
UPS does not start	1. Mains not present. 2. Problem with UPS.	Call engineer.
Indications: no mains present	1. Input mains not present. 2. Isolator defective. 3. LED may be defective.	No problem with UPS, Call engineer
Sudden shutdown of unit	1. Short circuit/ overload at output 2. System may be faulty	Check for short circuit / Overload. Call engineer
Excessive gassing of batteries	1. Charger section may be defective	Call engineer immidiately.

4 Technical Specifications

Online Triple Conversion UPS 1000VA / 24V with External Battery

Parameters		Specified Value (Acceptable Limit)
Specified Load		1000VA (700 W)
Input Mains	Voltage Window for PFC cut	165 VAC-285 VAC±10VAC
	Voltage Window for PFC recovery	175 VAC-275 VAC±10VAC
	Voltage window for charger cut	155 VAC-285 VAC±10VAC
	Voltage window for charger recovery	165 VAC-275 VAC±10VAC
	Frequency	45 Hz - 55 Hz
Output Mains or Backup Mode	Voltage Window	230 VAC±1%
	Wave Form	Sine Wave
	Frequency	50Hz±0.1Hz
Transfer Time		Zero Transfer time
THD	Under Linear Load	< 4.0 %
	Under Non Linear Load	< 7.0%
Efficiency	AC-AC	>90%
Efficiency	DC-AC	>83%
Input Power Factor	During entire mains input range	0.84-0.98 depending on load and battery charge status
Crest Factor		> 3:1
Battery	Type / Voltage	Lead-acid/SMF, 24V (2X12V), 65AH - 100AH
	Charging Current	7.0A ± 1.0A (Default Set)*
	Battery Low Warning	21.7V ± 0.4V
	Battery Low Cut	21.0V ± 0.4V
	Battery Boost Voltage	27.6V ± 0.4V

* Charging Current can be adjusted from 0.7A to 8A by using potentiometer (POT 2) on charger PCB card as per connected battery capacity from 7Ah to 100Ah

Protection	Overload	101-110%(system will shutdown after apporx 5 min.)
		110-125%(system will shutdown after apporx 3 min.)
		125-150%(system will shutdown after apporx 1 min.)
	Short Circuit	Short Circuit protection provided
	Output voltage at 100% load through on/off	+2% / -3%
	Battery deep discharge, Overcharge protection	Yes provided
Cold Start		Yes
Comm. Port		Yes
LED Bar LED / Alarm	**Load Bar**	**Battery Bar**
	o Overload (Red) o 100% (Green) o 75% (Green) o 50% (Green) o 25%(Green)	o 100% (Green) o 80% (Green) o 50% (Green) o 30% (Green) o Low (Red)
	Load	**(+ -) Battery**
	LED	**Alarm**
System on Utility Power	Green lighting	No beep
Back-up mode	Red	No beep
Low battery	Only red LED of battery bar will glow	B-----B---B— Continuous beep on shutdown
Overload	Red LED will glow with 25%-100% load bar green LED's	B-----B---B—(depends on % load) Continuous beep on shutdown
Short Circuit	Red LED(O.L.)	Continuous beep
Mechanical Dimensions	180(W)X512(D)X280(H)	
Weight	9.84Kgs.	

Note: Specifications subject to change without prior notice.

5 Warranty Card

WARRANTY CARD

Model No. :----------

Serial No. :----------

Name of Purchaser :----------

Address :----------

Date of Purchase :----------

Dealer's Name :----------

DEALER STAMP

6 Terms and conditions of warranty

- ★ SU-KAM POWER SYSTEMS LIMITED warrant to the original purchaser provided the product is still in possession of and used by the original purchaser from the date due of purchase.
- ★ The warranty stands on all parts (except LED's, switches and external body) for UPS will be for a period of 12 months.
- ★ The warranty will be automatically terminate on the expiry of the warranty period, even in case of the UPS not being in use in the specified period.
- ★ This warranty is valid only if it is duly signed by the authorized dealer.
- ★ The warranty will be invalidated if defects arising in company's opinion by reasons of accident, abuse, misuse, neglect, improper installation (if not undertaken by the company or its representative), fire, flood, or other act of GOD and any other natural calamities and any other unauthorized repairs done or carried out will have to be borne by the purchaser. The problem of fuse blown will not be included in the warranty of the product. The services given for the same will be paid service.
- ★ The company will not be held liable in any condition for any loss or injury or damage caused to life or property or death and disability caused to any form of life for any reason whatsoever.
- ★ The warranty will not apply if the original seals are found broken or tampered with.
- ★ Free service under the terms of warranty will be provided only by authorized representatives/dealers of the company anywhere in India.
- ★ The company expressly denies the right of any person to incur or assure for it any other liability or obligation in connection with the sale of UPS.
- ★ Claims if any, to this warranty shall be made only before courts having jurisdiction in New Delhi.
- ★ Now register your product or launch online complaints at www.su-kam.com for prompt after sales services.

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