

USER'S MANUAL (IFU)

DSP SINE WAVE INVERTER

Colossal Series
3/5/7.5/10KVA

S
SU-**K**
am

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

Customer Care : +91 124 4170561-566

Dear Customer,

We feel immense pleasure that you are now proud owner of Su-Kam DSP **Sine** Wave Inverter, designed and developed using State-of-the-art technology, for the first time in India.

The distinguished features of Su-Kam DSP Sine Wave Inverter are:

- ▣▣▣▣➤ World's most advanced technology.
- ▣▣▣▣➤ Designed for Heavy duty applications.
- ▣▣▣▣➤ Full regulated Pure Sine Wave output.
- ▣▣▣▣➤ PWM Controlled 5-stage ATM battery Charging.
Field settable heavy duty charger (6A-20A) for all capacity of battery (100Ah-200Ah)
- ▣▣▣▣➤ Reduced hardware so reduced failure rate.
- ▣▣▣▣➤ Automatic computerized testing.
- ▣▣▣▣➤ User friendly LCD panel for messages & faults.
- ▣▣▣▣➤ Smart overload sense and short circuit protection.
- ▣▣▣▣➤ Great power saving.
- ▣▣▣▣➤ DSP Sine Wave Inverter's complete technology is Indigenously developed at Su-Kam R&D center.
Future Expand ability Possible

Regards,
Su-Kam Power Systems Limited

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IMPORTANT SAFETY INSTRUCTIONS

Before proceeding further kindly go through the safety instructions carefully.

General Precautions:

1. Before using the DSP Sine Wave Inverter, read all instructions and cautionary markings on the Inverter, the batteries, all appropriate section of this instruction manual.
2. Do not expose DSP Sine Wave Inverter to rain, liquids of any type. The DSP Sine Wave Inverter is designed for interiors use only.
3. Do not disassemble the DSP Sine Wave Inverter. Take it to a qualified Su-Kam Service Centre in case service or repair is required. Opening by unqualified personnel entails electric shock or fire hazard.
4. To reduce risk of electric shock, disconnect all wiring before cleaning.
5. 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 from the battery compartments. 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 the instructions of battery supplier for any equipment you intend to use in the vicinity of batteries.

6. Use the correct tools to make AC/DC wiring connections.
7. Do not install this DSP Sine Wave Inverter on or near flammable materials (plywood, chemicals, gasoline etc.).
8. The DSP Sine Wave Inverter should be connected to a grounded, permanent wiring system.

Personal Precautions for Batteries

1. Someone should be within the range of your voice to come to your aid when you work near batteries.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near batteries. Wash your hands when done.
4. If battery acid comes in contact with skin or clothing, wash immediately with soap and water. If acid, enters eyes, immediately flood eyes with running cool water for at least 15 minutes and get medical attention immediately.
5. NEVER smoke or allow spark or a flame in the vicinity of a battery.
6. 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.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short – circuit current high enough to weld a ring or any metal causing severe burns.
8. Never attempt to charge a frozen battery.
9. If it is necessary to remove any batteries, always remove the grounded terminal from the battery first. Make sure all the accessories are off, so as not to cause arcing.
10. Be sure that area around battery is well ventilated.
11. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
12. Study all battery manufacturer's specific precautions and recommended rates of charge.
13. Add only distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without caps, carefully follow manufacturer's Recharging instructions.
14. Use caution when working with metal tools around batteries. Do not allow any metal object to come into contact with both battery terminals at the same time. Battery explosion or failure can occur.

Special Notices

1. The Inverter Charger is for use with a nominal battery bank of 100 - 200 Ah capacity.
2. No AC disconnects are provided as an integral part of this Inverter. Both AC and DC disconnects must be provided as part of system installation.
3. No over current protection for the battery supply is provided as an integral part of this Inverter. Over-current protection of the battery cables must be provided as part of the system installation.
4. No over current protection for the AC output wiring is provided as an integral part of this Inverter. Over current protection of the AC output wiring must be provided as part of the system installation.

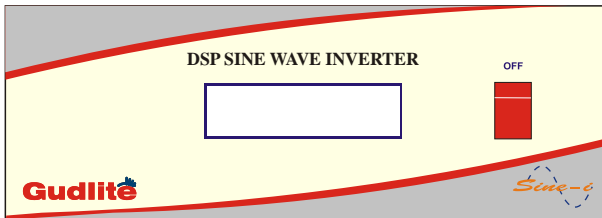
GROUNDING INSTRUCTIONS

This inverter must be connected to a grounded, permanent wiring system.

KNOWING YOUR DSP SINE WAVE INVERTER

In its most basic form, an Inverter transforms Direct Current (DC) to Alternating Current (AC). The battery bank with the Inverter acts as a reservoir to ensure continuous supply of power whenever mains supply from utility power is not available.

On the front Panel of DSP Sine Wave Inverter there is one ON/OFF switch and a LCD Panel.



PARAMETERS DISPLAYED ON LCD PANEL OF DSP Sine Wave Inverter

1. List of Parameters displayed on LCD when only battery is connected to the inverter and there is no mains & Inverter switch is in OFF condition.

a **Su-Kam**
Welcomes You


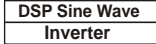


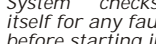
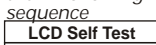

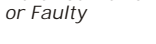
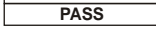
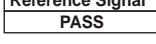
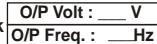
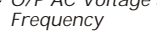

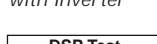
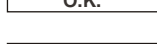
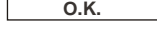

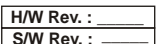
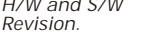
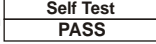
b **MAINS FAIL**
Inverter Switch OFF

c **MAINS FAIL**
Switch ON Inverter

d I/P Volt : 000.0 V
I/P Freq. : 00.0 Hz

e Battery V...:..... V
■■■■■■■■

2. List of Parameters displayed on LCD under no mains & Inverter Switch is in ON Condition. Whenever there is no mains & Inverter switch is switched ON, the Inverter performs Self-Test for once to check the status of the Inverter. If there is any fault (Reference Signal Fail, Auto Calibration Fail, Short Ckt., Over Load) the display shows only the fault after Welcome Note.

<p>a </p> <p>b </p> <p>c </p> <p>d </p> <p>e </p> <p>f </p>	<p>g </p> <p>h </p> <p>i </p> <p>j </p>	<p>k </p> <p>l </p> <p>m </p> <p>n </p> <p>o </p> <p>p </p>	<p>q </p> <p>r </p> <p>s </p> <p>t </p>
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*** Buzzer Test:** Either buzzer O.K. or Faulty

*** O/P AC Voltage and Frequency:** O/P AC Voltage and Frequency

*** H/W and S/W Revision:** H/W and S/W Revision.

*** Self Test:** If Self test result is Fail then restart the system once or twice. If still the problem exist call the Service Engineer



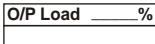
*** System checks itself for any fault before starting in the following sequence**

*** LCD display shows all digits as shown in window.**

*** If fail, then restart the system by using the front panel ON/OFF switch, if still the problem exist then call the service engineer**

*** Battery Voltage and Load O/P Current**

After the above messages, following messages are displayed in loop :

<p>a </p> <p>* Present status of Inverter.</p>	<p>b </p> <p>* Present Battery Status</p>	<p>c </p> <p>* Load on Inverter</p>
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The above three messages keeps scrolling on the LCD panel displaying Inverter Parameters one by one in the sequence shown above, till Mains recover.

3. List of Parameters displayed on LCD under mains ON & Inverter Switch is in ON Condition.

a	MAINS ON Battery Charging / Battery Charged	b	I/P Volt. : _____V I/P Freq. : _____Hz	c	Updating Battery Status	d	Battery Level : ____%
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• Displays Battery status in mains mode. whether Battery is charging or Charged • Mains I/P voltage & frequency

4. List of Parameters displayed on LCD Under various Protection Condition

a. 1. Overload Occurring - with buzzer 2. Overload Shutdown Occurred

a	** Attention ** Overload > 100%	b	** Remedy ** Reduce Some Load	a	** PROTECTION ** Overload Shutdown	b	Reduce Load and Restart Inverter
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This display shows that Inverter is in Over Load Condition (Condition 1, See above), i.e, the running load (VA) on the inverter is above the rated system capacity. In this case system resets itself automatically and makes 4 attempts to turn ON again. If the overload continues even after the 4th attempts, it turns OFF permanently (Condition 2 above) and will turn ON only after the switch on the front panel is turned OFF and then turned ON.

b. Short Circuit Occurred - with buzzer

** PROTECTION ** Short ckt. / Overload	* Remedy * Check Wiring / Reduce Load / Restart Inverter
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This Display shows that Short Circuit has occurred at the out put and Inverter has gone into Shutdown immediately with continuous buzzer beep. Switch OFF the Inverter. Switching off Inverter will stop beeping the buzzer immediately. Now remove Short-circuit and then switch ON the Inverter.

c. Battery Low Attention - with buzzer

1.	** ATTENTION ** Battery Low	** REMEDY ** Reduce Load or Shutdown Inverter	11.	** PROTECTION ** Battery Low
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This display shown when battery goes down to a set limit during discharge. (Condition 1, See above) The buzzer will start beeping and the Inverter will Shut off after few minutes. In this condition Inverter will make four attempts to restart again and if low battery continues, it turns off permanently (condition 2, see above). It will turn ON only when ON/OFF switch on the front panel is turned off and then switched ON.



d. Mains MCB Trip
**** PROTECTION ****
Mains MCB Trip
**** REMEDY ****
Reset the MCB
at back panel &
reset the Switch

This Display shows when the mains MCB is tripped. First switch OFF the mains and Inverter. Now turn ON the Main MCB & then reset the switch to ON.

e. Mains Low Cut (Inverter Switch ON)
Mains Low Cut
Inverter ON
Battery V : ____ V
O/P Load : ____%

This Display shows Low Cut protection. In this condition system comes on Inverter mode and the mains will get cut off. The above three messages keep on scrolling on the LCD panel one by one till Mains recover.

f. Mains Low Cut (Inverter Switch OFF)
Mains Low Cut
Inverter Switch OFF
I/P Volt : ____ V
I/P Freq. : ____ Hz
Battery V : ____ V

In this condition the system gets permanently shutdown. For using, Inverter should be switched ON if the battery is charged.

g. Mains High Cut (Inverter Switch ON)
Mains High Cut
Inverter ON
Battery V : ____ V
O/P Load : ____%

The Display shows High Cut protection. In this condition, the system comes on Inverter mode and the mains will get cut OFF. The above three messages keep on scrolling on the LCD panel one by one till Mains recover.

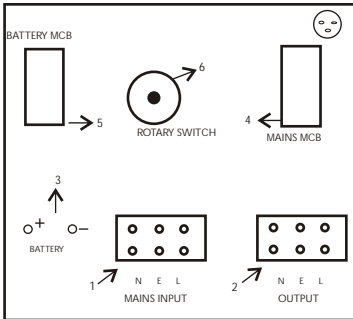
h. Mains High Cut (Inverter Switch OFF)
Mains High Cut
Inverter OFF
Battery V : ____ V
O/P Load : ____%

In this condition the system gets permanently shutdown. For using, Inverter should be switched ON if the battery is charged.

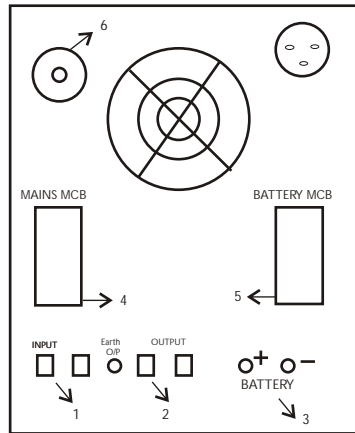
B) BACK PANEL

The Inverter has two battery terminals Mains MCB & Battery MCB, Input terminal block and Output terminal blocks at the rear side. Connect the two battery wires to the terminals of the battery, the red colored to positive terminal and the black colored to the negative, seeing carefully the colors and the positive and negative terminals of the battery. Ensure that incoming phase (or line) is connected to line (red wire). Neutral is connected to neutral (black wire) and earth is connected to earth (green wire). After this the output is connected through the output Terminal, at the rear of the inverter.

5KVA/96V



7.5KVA/10KVA



1. 3 Way Input Terminal Block.
2. 3 Way Output Terminal Block.
3. Battery terminals.
4. Mains MCB.
5. Battery MCB.
6. Manual Bypass Switch

C) CONCEPT OF CHARGING

FIVE STAGE ATM PULSE CHARGING

BULK : Batteries are charged at maximum allowed continuous constant charging current at constant voltage for speedy charging of battery up to 13.8V per battery.

BOOST : The charger checks the charging current when the battery voltage reaches Max. 13.8V for 12V batteries. The boost mode of the charger will be activated, which will boost the battery Max. up to 15% more than its rated voltage (13.8V for 12V batteries) and charging current reduced to 50% of bulk charging rate (i.e. 4 to 5 Amp).

TAPER : When the voltage level of battery is 15% more than its rated voltage, the taper mode of the charger will be activated, which will keep the charging current about 4 Amp to achieve the specific gravity of electrolyte for full charged battery.

FLOAT : In float stage, the charger keeps the charging voltage & current level at its trickle charging set point Max. 13.8V with minimum charging current 1.0 Amp.

PULSE (RESET) : To maintain the float level, the charger resets to zero current at Max. 13.8V for some time and starts again with pulse charging of 1 Amp current at same voltage. This keeps the battery in full charge condition even when not in use.

SALIENT FEATURES

ATM Charger

- ▶ ATM with Pulse charger is used for the first time in Inverters. Till now this feature was available only in online UPS.
- ▶ ATM stands for Auto Trickle Mode.
- ▶ It is fully software controlled.
- ▶ ATM with Pulse Charger charges the battery to its full capacity & after charging, it maintains the battery at its Float voltage level, so the Water loss in Battery is almost zero.
- ▶ Conventional chargers always keep the battery above float voltage level thus deteriorating the battery life & causing water Loss.

Auto Reset

Su-Kam DSP Sine Wave Inverter has auto-reset function in case of Overload, Short Circuit and Low Battery. It will reset the Inverter in fault condition automatically and will make 4 attempts for the same. If the fault condition is rectified within this period then the Inverter will reset itself automatically. Otherwise it will shut off and you will have to reset the Inverter manually by turning ON/OFF the switch on its front panel.

Protection Circuitry

The Su-Kam DSP Sine Wave Inverter is protected from high battery voltage, low battery voltage and short Circuit conditions. When the inverter senses one of these situations, it will protect itself by disconnecting from the loads, and will signal an error condition by displaying along with buzzer beeping.

The low battery cutout, high battery shutdown resets automatically. If an over current condition continues for more than 20 seconds, the Inverter will show it in display and shut down, which must be reset with the power button in front.

Automatic Low Battery Cutout

The Su-Kam DSP Sine Wave Inverter protects your batteries from damage caused by over-discharging by automatically shutting itself off when battery voltage falls to a preset level.

This feature is called the Low battery cutout. The Su-Kam DSP Sine Wave Inverter comes from the factory with the LBCO voltage set at 15% below the rated battery voltage level.

Automatic High Battery Cutout

When battery voltage rises above 15% more than the rated battery voltage (Max.13.8 for 12V Battery), the charger stops its normal charging and comes to the float mode so as to take care of the self-discharge of the battery. The charger automatically resumes operating when battery voltage drops to 10% more than the rated battery voltage (Max.13.2 for 12V battery) volts.

Over Current Cut Out

Su-Kam DSP Inverter is protected from over current conditions. When the load being run demands more current, the inverter shuts down automatically along with display indication there for.

Battery Type Optimization

Su-Kam DSP Sine Wave Inverter is designed to prevent damage to batteries and extend the useful life of your batteries by regulating the charging voltage and duration. To do this, the inverter must be configured for the type of batteries in the system.

Charge Rate Regulation

Batteries can overheat if the charge rate is too high. The Su-Kam DSP Sine Wave Inverter protects your batteries by limiting the charging current, so that the regulation can adjust the charging current to the optimum level.

Volts AC Dropout

Su-Kam DSP Sine Wave Inverter monitors the voltage of the AC power passing through to the charger and AC loads. When AC voltage falls below the preset level, the inverter automatically transfers from AC to DC power (i.e. it comes to inverter mode). This dropout voltage is factory preset at 140-150Volts. So when the AC voltage drops to 140-150 volts, the inverter automatically transfers from AC to DC power. It will revert to mains with a hysteresis of 10V.

Reduces Inverter's Power Consumption

In Su-Kam DSP Sine Wave Inverter the circuitry design reduces the power intake of Inverter when the battery is in pulse charge mode and evaporation of battery electrolyte is also minimised.

GETTING STARTED

Mounting

Mount the Inverter securely in horizontal position in a clean, dry and well ventilated place.

DC Cabling

Ensure that the On/Off switch on the front panel of the Inverter and MCB's at the rear of inverter are in the off position before you begin the installation.

Connect the positive wire (Red) of the battery to the positive Battery terminal of the Inverter. It is advised not to use any other extra cable for batteries other than those supplied by the company.

Connect the negative wire (Black) of the battery to the negative Battery terminal of the Inverter.

AC Cabling

AC input supply is to be given at the terminal strip such that line is connected to line terminal, neutral to neutral terminal and earth to earth terminal.

Wrap Up

Secure all the wiring with ties or other non-conductive fasteners to prevent damage.

Check to see that the Inverter front panel switch is in the off position, then reconnect to the AC power source.

Turn the Inverter to the ON position and check Inverter operations.

INSTALLING THE INVERTER

Environment

Inverter is a sophisticated equipments and must be treated accordingly. Keep the inverter in non-condensing, well ventilated environment ensuring that there is no ingress of moisture or foreign materials.

Location

Locate the Inverter as close to the battery as possible in order to keep the battery cables short, however do not locate the inverter in the same compartment as non-sealed batteries.

Batteries generate gases which are very corrosive to electronic equipment and everything else.

Mounting

Mounting the Inverter in a ventilated enclosure with sealed batteries is acceptable. Never mount the Inverter in a closed container. To operate at high power for sustained periods of time, unrestricted airflow is required. Without it the protection circuitry will activate and reduce the maximum power available or cause the complete shutdown of the inverter. As per standards inverter should be mounted on a flat surface.

🔌 **Note :** Never disconnect the battery cables while the Inverter is delivering power or battery charger is operating. The ON/OFF switch has no effect on the charger, it turns OFF only the inverter. To disconnect the batteries for service

- a) Turn OFF the power switch, Switch OFF the MCB's at rear.
- b) Disconnect all AC power,
- c) Disconnect all the battery cables.

DC Cabling Connections

In Su-Kam Inverter the battery cables are colour coded according to the standards, i.e. red for positive (+) and black for negative(-)

Fuses and disconnects must be sized to protect the wiring in the system. The fuse is required to blow before the wire reaches its maximum current carrying capability.

AC Wiring

AC and DC Wiring Separation

AC and DC Wiring Separation

Do not mix AC and DC wiring in the same conduit. A separate conduit should be used for each.

AC Wiring Connections

The following steps are a basic guidelines for installations and connections of the AC wiring into and out of the Inverter.

- ▣▶ Disconnect the Inverter from the battery bank (if already connected)
- ▣▶ Connect AC input supply to the terminal strip of the inverter such that line is connected to 'L', neutral is connected to 'N' and earth is connected to 'E'. AC input supply should remain ON once the inverter is installed. Take output from Output Terminal Block or socket.

Important Precaution

The output side of the Inverter's 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.

OPERATION

Once the AC and DC wiring have been installed and connected, take a moment to go back over all the connections and make sure that wiring is secure and in the proper terminals.

1. Check to see that the Inverter is turned off, then apply battery (DC) power to it. Ensure that all wiring has been installed properly. Next turn on the battery bank DC disconnects or connect the proper fuse in line to the battery to complete the battery circuit.
2. Put Power switch to the ON position. The Inverter should run a load without AC input (battery only). Place a load on the inverter and make sure it works.
3. To charge your batteries connect AC power to the Inverter by plugging in the AC power and turning ON the mains line. The inverter should show the mains on, battery charging on display. This shows that charger is working properly. Any AC loads powered by the inverter should also work at this point since a portion of the AC power is passed through the inverter to power the loads. The delay before connecting is provided while the Inverter is sampling the AC power to see that it is within acceptable frequency and voltage limits.

4. Disconnect the AC power :The Inverter should transfer to inverter mode immediately.This will be indicated by a clicking sound as the internal transfer relays change position.The inverter will begin to take power from the batteries and use it to power the loads.The loads should continue to operate uninterrupted.

The above steps will complete a functional test of the inverter. If all areas pass, the inverter is ready for use. If any area fails, figure out why before proceeding.

BATTERIES

There are two principal types of batteries, starting and deep cycle. There are several different types of battery chemistries including liquid lead acid, nickel iron, nickel cadmium, alkaline, and maintenance free. Batteries are sealed or vented.

Starting Batteries Automotive

Starting Batteries Automotive are designed for high cranking power, but not deep cycling. Do not use them with your inverter.They do not hurt the inverter but they simply will not last long in a deep cycle application.They use lot of thin plates to maximize the surface area of the battery.This allows very high starting current but lets the plates warp when the battery is cycled.

Deep cycle Batteries

Deep cycle batteries are best suited for use with inverters.They are designed to have the majority of their capacity used before recharge.Available in many sizes and types, the most common type is the non- sealed, liquid electrolyte battery. Non-sealed types have battery caps.The caps should be removed at least monthly to check the level of electrolyte.When a cell is low, only distilled water should be added. The electrolyte level should be checked and topped up if needed after recharging.A hydrometer can also be used to check the specific gravity of the battery, which should be around 1260 in full charge condition.

BATTERY REQUIREMENTS

Environment

For long life and good performance, batteries need to be located in protected enclosures insulated from extreme temperature.

Location : Batteries should be located in an accessible location with access to the battery caps and terminals. At least six inches of clearance above is recommended. They must be located as close as possible to the inverter.

Enclosures : Batteries must be kept inside a ventilated enclosure. The enclosure should be ventilated to the outdoors from the highest point to prevent accumulation of hydrogen gasses released in the charging process. An air intake should also be provided at a low point in the enclosure to allow air to enter the enclosure to promote good ventilation. For most systems, a one-inch diameter vent pipe from the top of the enclosure is adequate to prevent accumulation of hydrogen.

BATTERY BANK SIZING

Batteries are the inverter's fuel tank. The greater the (Ah) capacity of the batteries, the longer the inverter can operate before recharging is necessary. An undersized battery bank results in reduced battery life and disappointing system performance. Batteries should not be discharged more than 50% of their capacity on a regular basis. Under extreme conditions, cycling to a discharge level of 80% is acceptable. Totally discharging a battery may result in permanent damage to it and reduced life.

TERMINOLOGY

Here is a description of terms with which you may not be familiar with :-

Electrolyte : Typically a mixture of water and sulphuric acid, it is commonly referred to as battery acid.

Plates : Originally made of lead, now fabricated from lead oxide. Plates connect to the battery terminals and provide a structure for the chemicals that create current. There are several plates in each cell; each insulated from the other by separators.

Sulphating : As a battery discharges, its plates become covered with lead sulphate. During recharging the lead sulphate leaves the plates and recombines with the electrolyte. If the lead sulphate remains on the plates for an extended period of time (over two months), it hardens, and recharging will not remove it. This reduces the effective plate area and the battery's capacity.

Stratification : Over time a battery's electrolyte (liquid) tends to separate. The electrolyte at the top of the battery becomes watery while at the bottom it becomes more acidic. This effect is corrosive to the plates.

Deep Discharge : A deep discharge occurs when a battery is discharged to less than 20% of its capacity (80% depth of discharge).

TROUBLE SHOOTING

Symptoms	Rectifications
Main power is coming. Inverter shows mains MCB Trip on its display panel	Reduce the load and reset the mains MCB given at rear side of the Inverter.
No power during backup mode	(1) Check if low battery graphic symbol is glowing, switch OFF the Inverter by power active switch. Allow the battery to charge when the mains is resumed before running the Inverter on battery again.
Inverter does not operate	(2) Check if overload/short circuit graphic symbol is glowing. Reduce load and reset the Inverter by Power Active switch.
Inverter Trips Frequently At Backup	Check the battery connections and the mains connections
Mode	Reduce the load and restart Inverter through Power Active Switch.

Symptoms	Problem	Remedy
There is no output power	(1) Low Battery	Check condition of batteries and recharge.
	(2) Loose or corroded batt. Connections	Check and clean all connections
	(3) Loose AC output connection	Check all AC output connections
System shuts down after 20 sec no display at all	Output of Inverter is wired back to its own input	Check for proper AC input and output wiring
Low AC output voltage	Measuring with the wrong type Voltmeter	Meter must be a true RMS reading meter
Low surge power	Weak batteries, battery cable too long	Refer to cable and battery recommendations in this manual

TECHNICAL SPECIFICATIONS

MODEL	CLS-3K	CLS-5K	CLS-7.5K	CLS-10K
CAPACITY	3KVA	5KVA	7.5KVA	10KVA

INPUT P ARAMETERS

Mains A.C. Low cut	110 ± 5V
Mains A.C. Low cut Recovery	120 ± 5V
Mains A.C. High cut	280 ± 5V
Mains A.C. High cut Recovery	270 ± 5V

OUTPUT P ARAMETERS

Mains Output Frequency	Same as Input (45Hz-55Hz)
Inverter Output Frequency	50.0 Hz. ± 0.1 Hz
Output Voltage with Full Load	220V ± 5V
Wave form	Pure Sine Wave
Overload	Above 110%
Short Circuit protection	>300% Load (Few mSec)

BATTERY

DSP Controlled PWM charging with Soft start over full range of Mains	
Charging Current (Settable)	6A-20 Amp
Charging Boost Voltage	14.0V ± 0.2V per battery
Charging Float Voltage	13.7V ± 0.2V per battery
Battery Lower Voltage Limit	10.0V ± 0.2V
Recommended Battery capacity	100Ah - 200Ah

TECHNOLOGY

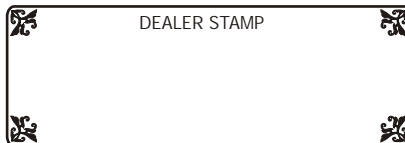
- Digital Signal Processing (DSP).
- PWM controlled IGBT based CC / CV charger with soft start.

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 of purchase.
- ★ The warranty stands on all parts (except LCD's, switches and external body) for Inverter 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 Inverter 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 is in no way are will be held liable 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 Inverter.
- ★ Claims if any, to this warranty shall be made only before courts having jurisdiction in New Delhi.
- ★ Please send your query or Complaint to info@su-kam.com

WARRANTY CARD

Model No. : -----
Serial No. : -----
Name of Purchaser : -----
Address : -----
Date of Purchase : -----
Dealer's Name : -----



OTHER PRODUCTS

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SSu-Kam
www.su-kam.com

SU-KAM POWER SYSTEMS LTD.
FACTORY : A) 64, DIC INDUSTRIAL AREA, BADDI, DISTT. SOLAN (H.P) INDIA
 B) 196-C, SECTOR-37, PH-VI, DISTT. GURGAON (HARYANA) INDIA
REGD.OFF.: WZ-1401/2, NANGAL RAYA , NEW DELHI-46