www.su-kam.com

Su-Kam
Ek nayi soch

CONVERT SUNSHINE TO GOLDEN SAVINGS AND A GREENER PLANET

SOLAR PRODUCT CATALOGUE 2013-14

Section - 03

THE SUNSHINE REVOLUTION

India is one of the sunniest countries in the world, enjoying over 300 days of sunshine every year. And energy from the sun can potentially solve India's perennial power crisis for all time to come. Because the sun's energy will never get exhausted.

At one time, generating electricity from the sun was seen to be unaffordably expensive for the average home owner. But technological advances have led to prices falling sharply and the rate of return on investment has correspondingly risen. As a result, more and more corporates, smaller enterprises and households are successfully going solar.

The government is actively encouraging the adoption of solar energy, with new policies, subsidies, tax savings and the promotion of the private – public partnership model. Isn't it time you went solar, too?

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Certifications

ISO 9001:2008 ISO 14001:2004

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

SOLAR PRODUCT CATALOGUE 2013-14

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ABOUT US

Su-Kam was founded in the year 1988 by Kunwer Sachdev, popularly referred to as the 'Inverter man of India'. At present, Su-Kam is one of the leading power back up, generation & monitoring company in India with a wide array of best in class products, In-house R&D center, product innovations, highly efficient manufacturing units, widespread dealer, distributor & service network, robust exports, strong workforce, large project base, numerous awards & recognitions and a wide string of firsts to its credit.
In the coming years, Su-Kam which has forayed in the solar sector already is planning to make huge waves by its innovations and projects in the solar industry. The company is leaving no stones unturned in bringing the best minds together for developing newer solar technologies, products, monitoring software etc. to bring about a solar revolution that shall change the face of the solar industry forever.

Wide range of products from the Su-Kam stable

Su-Kam manufactures a wide range of over 200 products; each product has been built on a strong foundation of advanced technology backed by innovation. The vast range of product categories Su-Kam deals in are Simple & High Capacity Inverters and Home, Commercial, Online & Line interactive UPSs catering to capacities up to 500 KVA. The company also specializes in manufacturing Lead Acid, Tubular, SMF, Tall Tubular & Automotive batteries, Battery equalizers, Battery accessories along with Diesel, LPG & CNG Gensets for capacities over 1000 KVA. Products in the newly formed solar range include solar inverters, solar charge controllers, power conditioning units, solar lighting systems etc. All these products cater to a wide range of segments; residential, commercial and industrial applications.

The pioneer of Innovations

At the time of Su-Kam's inception, the power back up sector in India was completely unorganized. Su-Kam's foray into the sector led to development of products with innovative technologies that were never seen before in the country. These developments changed the face of the industry altogether and developed the markets for other players to follow suit. Some of the innovations from Su-Kam that changed the industry are - India's first 'Sine Wave Inverter' that eliminated the irritating humming sound and ensured high quality power output, India's first 'MOSFET based Inverter' and India's first ever 'Home UPS' that combined the functions of an inverter and UPS and eliminated the use of two systems. Su-Kam was also the brains behind developing India's first ever 'High Capacity UPS' that could run ACs, refrigerators and other heavy load equipments. It was also the first company to develop India's first 'Plastic Body Inverters'; the product 'Chick' being adjudged as one of the top innovations of the decade!

Changing the existing paradigm: Advancing rapidly in the field of Solar

Today, Su-Kam is a dominant force in the power back up energy sector in India. It started with manufacturing inverters which changed the age old paradigm and converted the inverter industry into a highly technically advanced sector.

Over the years, Su-Kam has constantly developed products through innovation and advanced technology. The company has now forayed into the solar sector. In this sector as well, Su-Kam has introduced highly useful and value-for-money products for the common man and executed large projects for commercial and industrial applications, thereby reducing the customers' hefty renewable energy bill expenses and contributing in the process in reducing their carbon footprint.

Due to Su-Kam's innovation in the field of solar, a common user can convert his existing inverter into a solar inverter by using Su-Kam's solar mate product. He can light up his home in remote locations and villages through Su-Kam's solar home lighting system. He can shift to solar inverters through Su-Kam's Brainy, Solar PCUs, Charge controllers, and monitor and track the solar output of his appliance through the remote monitoring software and umpteen number of other Su-Kam solar applications.

State-of-the-art Manufacturing facilities

Su-Kam has 6 state-of-the-art factories in India. All the manufacturing facilities combine the latest technologies with best practices and are certified under OHSAS – 18001 for operational health and safety.

The plants are fully equipped with Automatic Testing Rigs for inspection of control cards & various other products besides being endowed with automatic wire cutting, stripping and crimping machines, conveyorised production lines & on line computerized product testing facilities with a highly-trained technical team functional at all levels.

Some of the Quality Control Systems incorporated in the manufacturing facilities are SQA - Supplier quality assurance and capability analysis, IQC- Quality of incoming raw material, IPQC - In-process product quality control, PDQA - Checking the quality of products at the pre-dispatch stage, IQA- Internal quality audits as per ISO 9001, ISO 1400 requirements. The company also follows sampling plan as per standard IS 2500 & AQL 0.65 and Pre Dispatch Quality Assurance is done on Sampling basis as per IS 2500 & AQL 1.5.

Su-Kam has been awarded coveted certifications from the most stringent certifying organizations globally, some of which are CE, UL, ISO 9001 and ISO 14001. The Company's inverter plants have a capacity of manufacturing 2.5 Lac Inverters per month. The company's transformer plant is the largest manufacturer of transformers in the industry!

Large projects undertaken by Su-Kam

Su-Kam has conducted large scale Off Grid and Grid Tie solar roof top installation projects across numerous sites in both India and abroad.

In India, the company has installed solar systems in the Assam Rifles regiment in Nagaland & Mizoram; in remote forest areas of the Madhya Pradesh Forest Department; in Govt. buildings like the Raj Bhawan in Itanagar, Assam State Electricity Board; Reputed colleges like Loyola College in Chennai, Gates Institute in Andhra Pradesh, J.J.Polytechnic in Trichi; at a number of petrol pumps across India in both remote and populated locations; in hospitals and nursing homes in Bihar, Andhra Pradesh & Maharashtra; street lighting projects in Tamil Nadu and in industries like Ashok Leyland to name a few. In all the aforementioned projects, the company has reduced the site's requirement of energy from conventional sources of energy to almost 0 %!

Su-Kam has undertaken a large number of solar projects overseas, some of them being installing solar solutions to power telecom towers in Afghanistan to aid the US army's needs, solar solution installation at schools, colleges, institutions, hospitals, industries, forests, street lights in African countries of Nigeria, Rwanda, Gabon, Malawi etc. to name a few.

Gates Engineering College, Anantpur(A.P)
100Kwp Solar Off-Grid Power Plant

Street lighting project in Gabon, Africa

Wind Care ,Madurai (Tamilnadu) 69Kwp
Solar Off-Grid Power Plant

Assam State Electricity Board, 100 kWp Power Plant

Snap Shot: 100 KWp Ground Mounted
Solar Power Plant, Assam Rifles,
Keithalmanbi

40 kwp Power Plant at Itanagar, Governor House

Solar installation project for
telecommunication towers in Afghanistan

Power back up solution provided to
Bharti Walmart

Snap Shot: 50 KWp Ground Mounted Solar Power Plant,
Assam Rifles, Somsai.

Global presence

Su-Kam has a massive presence in over 70 countries across the globe covering the major expanse of South East Asia, Africa, Middle East and Latin America! Across various geographies, Su-Kam has built up a network of over 12000 dealers and distributors overseas along with a robust service network. The company has branch offices in Dubai, Sharjah and Nigeria. In 2012-13, the company clocked revenue of over 110 crores from exports!

Su-Kam is present in Afghanistan, Algeria, Angola, Australia, Bangladesh, Botswana, Burkina, Faso, Burundi, Cameroon, Chad, D.R.Congo, Djbouti, Dubai, Egypt, Ethiopia, Ghana, Gabon, Guinea, Indonesia, Iraq, Israel, Japan, Kenya, Lebanon, Malawi, Myanmar, Namibia, Nepal, Nigeria, Palestine, Phillipines, Rwanda, Senegal, Sierra leone, South Africa, Sri lanka, Sudan, Syria, Tanzania, Uganda, Yemen, Zambia and Zimbabwe to name a few. Su-Kam has emerged as the biggest brand in its category in 22 countries across the world!

Su-Kam inverters/UPS/batteries are the most sought after brand in the African continent with a strong presence in over 30 countries there. The Su-Kam brand is the number 1 power back up brand in African countries like Uganda, Nigeria, Kenya, Malawi, Congo and Burundi etc.

The company regularly holds dealer and distributor meets for their international channel partners and is a prominent participant in exhibitions and trade fairs across the world. Su-Kam has also sponsored sports events in countries like Dubai, Malawi, Nepal, Nigeria, Senegal and Uganda.

Global Certifications

Su-Kam was the first company in the power back-up industry in India to obtain a CE certification. CE mark certifies that a product has met European standards of Consumer safety, Health and Environmental requirements. CE certification is a must to export to 27 countries of Europe. Su-Kam also holds additional certifications like OAPI, ISO9001:2008, ISO 14001:2004, IEC 61215 Standards and ARIPO Certificate.

Widespread Dealer, Distributor & Service Network

Across various geographies in India and abroad, Su-Kam has built-up a wide and robust network of over 30000 dealers and distributors and has also set-up 200 service centers worldwide. Since its inception, the Su-Kam sales team has strived hard to set up this wide dealer-distributor network in every nook and corner of India and abroad by invoking confidence and spreading awareness about the best-in-class and technologically highly advanced Su-Kam products and services. Su-Kam's call center is functional 24*7 and works in unison with Su-Kam's team of service engineers who are spread throughout the country to provide round the clock service to all the customers.

The change agent in the field of technology and marketing

Su-Kam was the first company in the Power back up industry in India to set up an in house R&D unit that churned out highly advanced power back up products and technologies that changed the face of the inverter industry and paved the way for other players to adopt the technologies introduced by Su-Kam.

The Su-Kam R&D center was recognized by the Central Government's Department of Scientific and Industrial Research in the year 2002. The Su-Kam R&D team has developed various new products and has filed the highest number of patents in the industry. Su-Kam is credited with the largest number of patents filed for technology and design and has over 80 technology patents, 180 Copyrights and 170 trademarks to its credit. With nearly 2 technology patents filed every month, the company expects to file an impressive 100 technology patents by this year end.


ORIGINAL

No. 3501

GOVERNMENT OF INDIA
THE PATENT OFFICE
DESIGN OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Controller General of Patents, Designs and Trade Marks

Today, the R&D team of Su-Kam has 45 highly experienced experts and has a number of awards to its credit. Su-Kam is the only power back-up company to have earned remarkable recognition from the Department of Scientific & Industrial Research, Govt. of India for its contribution to technology.

Su-Kam has built a strong brand image by undertaking extensive marketing activities since its inception. The company has undertaken marketing activities like innovative advertising campaigns both print and electronic, outdoor hoardings like Dhaba branding on highways & villages, shikara branding, van activities, traffic barricade branding, reality talent hunt shows etc. Today Su-Kam enjoys the brand image of being an innovative and honest power back up solutions provider in India and abroad among the masses.

Work culture inspiring holistic growth

Su-Kam, which has a strong employee base of over 3000 members, strongly believes in creating a workplace environment that is extremely conducive for the growth of all its employees. At Su-Kam, the workplace offers an environment that provides each employee the independence to express their views and opinions freely irrespective of the position they are at. Each employee is allowed to be experimenting and given freedom to bring about his own work place innovation. The company conducts regular training programs and off sites for employees to help them develop and grow further and to foster a holistic learning environment.

The company awards its high performers, achievers and long term employees at various ceremonies eg. Long service awards, Employee of the year award, Pat on the back award, Fast track promotions, Cross functional movements etc. Su-Kam therefore provides them an environment and platform to grow, gather experience and excel in life.

The company believes in engaging employees through various engagement activities like festival celebrations, birthday celebrations etc. A special weeklong activity called sports week is conducted every year wherein the company encourages employees to participate in sports/games of their choice. Through this initiative, not only do all employees realize and nurture the spirit of sportsmanship but also get an opportunity to bring out the best in each one of them. The series of games and matches stimulate a healthy competitive attitude and helps all Su-Kam employees to bond together as a family at the same time.

Su-Kam has several employees who have completed more than 20 years, 15 years and 10 years with the company, respectively. The company ensures that an employee who strives hard and is deserving, moves up the ladder quickly. For eg. Su-Kam's current Director-Technical had joined the organization as Senior Engineer and has moved to his current position in a very short time span of just 10 years.

Su-Kam-Widely covered by media in India and abroad

Media in India and abroad has covered Su-Kam extensively. India Today magazine featured Su-Kam in the year 2010 naming it as one of the top 10 innovations of the last decade!

Numerous other leading publications like The Times of India, Hindustan Times, The Hindu, Indian Express, Business India, Business Today, Zee Business, CNBC, ET Now, Times Now, NewsX to name a few have been covering Su-Kam's story for years now.

Su-Kam is also known to be the 'Most written about' company in the field of power back up solutions. The saga of Su-Kam has been included in the book – 'How 11 Indians pulled off the impossible – Making Breakthrough Innovation Happen', written by Mr Porus Munshi and published by the world famed Harper Collins Publishers. Another book 'Connect the dots' by Rashmi Bansal talks about the journey of Su-Kam's founder Mr Kunwer Sachdev and the company's journey since inception. A case study of Su-Kam has also been included in management studies at the renowned IIM, ISB & MDI.


Business India

THE MAGAZINE OF THE CORPORATE WORLD

Igniting the power back-up industry


INDIA TODAY

THE POWER ECONOMY


hindustantimes

'Top bosses should inspire employees'

Kunwer Sachdev of Su-Kam feels a CEO should be able to manage, train and motivate his people

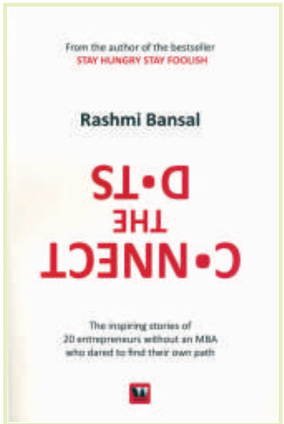

Su-Kam

Selection of Chic Inverters as one of Top 10 Innovations by 'India Today' comes in same category as Tata Nano, Reva.

IGNITED MINDS

20 INNOVATORS WHO ARE CHANGING OUR LIVES

"Plastic body inverter-2002"-Designed by Su-Kam, it uses advanced plastic to withstand high temperatures and yet gives a user-friendly finish.


From the author of the bestseller STAY HUNGRY STAY FOOLISH

Rashmi Bansal

CONNECT THE DOTS

The inspiring stories of 20 entrepreneurs without an MBA who dared to find their own path


Business India

A chance encounter


HOW 11 INDIANS PULLED OFF THE IMPOSSIBLE

MAKING BREAKTHROUGH INNOVATION HAPPEN

PORUS MUNSHI


THE NEW INDIAN EXPRESS

Su-Kam's solar revolution in TN

Awards & Recognitions

Su-Kam has received a number of awards and accolades over the years for innovation, exceptional products and quality of service provided by the company. Some of these are:

FEW OF OUR ACCOLADES

powerbrands™
innovation in health, beauty and hospitality

Power Brand India 2009-10

Asian Leadership Award for Brand Excellence in Business Innovation

Asia's Most Promising Brand Award

Inc. Innovative 100 Award for "Excellence in Innovation"

Best Overall Talent Management Organization of the year by ET Now

EFY Reader's choice award for SMF batteries

EFY Reader's choice award for UPS systems

Frost & Sullivan Voice of Customer Award

India Inc. 500 "Fastest Growing Organization Award"

Enertia Award 2011

Entrepreneur of the year award by Franchise India

Business Superbrand

Innovation for India Award by Marico Award Foundation

Consumer Superbrand

Sectoral Award-Non SSI (Consumer Electronics) from Export Promotion Council, Government of India

ELCINA - EFY Award for excellence in R & D

West Africa's Best Inverter Brand

West African Branding Excellence Award

Africa's Most Reliable Brand Awrd

National Award for Quality Product from Government of India

Amity HR Growth Award in Global Business

The List Continues...

ON GRID/GRID TIE SOLUTIONS

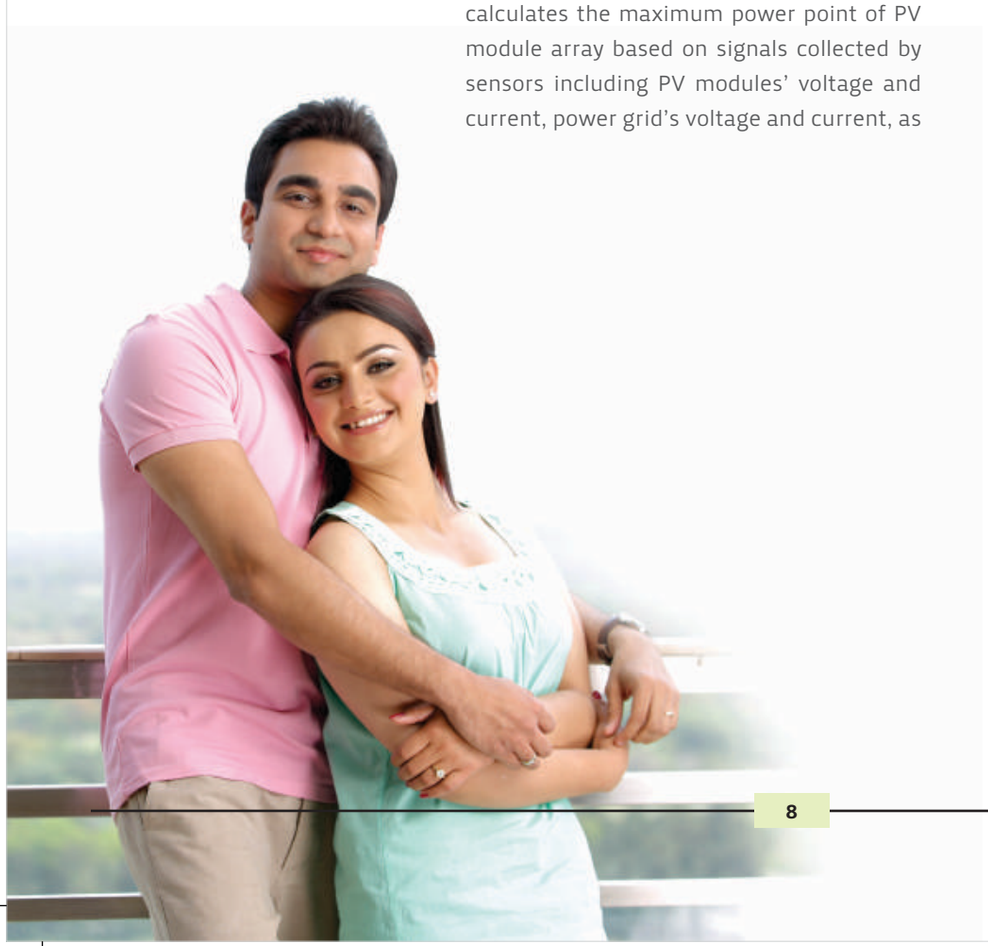
A solar grid-tied inverter converts the DC output of PV modules into AC power suitable for transmission on the power grid, or use it for your own consumption, often deploying reactive power to meet new grid codes. It must always optimize the power output via MPPT (maximum power point tracking) and additionally monitor both the system and grid connection. In practice, each solar inverter installed in solar power plants needs to connect an array or string of PV modules to the power grid. The more efficient the inverter, the better the LCOE (levelised Cost of Electricity) generated by the system.

An on-grid solar inverter is composed of a DC-DC module, a DC-AC module and a control module. DC-DC module is built with a MOSFET, an inductor and a transformer, and functions to provide a stable DC output through rectifying and filtering the unstable DC power produced by PV modules; DC-AC module includes an IGBT array and an output filter circuit to convert the DC output of DC-DC module into an AC output suited for transmission on power grid. Control module is the core of whole system. It has a DSC, a voltage sensor, a current sensor, and a driver that drives MOSFET and IGBT module. DSC calculates the maximum power point of PV module array based on signals collected by sensors including PV modules' voltage and current, power grid's voltage and current, as well as phase. And accordingly it sends out instructions to driver which drives DC-DC and DC-AC modules. Furthermore, DSC is able to find out abnormal conditions such as transmission failure of power grid and take measures such as cutting off the connection between inverters and grid to prevent "island effect" occurences on power grid. Additionally, the control module has an interface for external display showing PV modules' status and input/output voltage and current, and integrates a RS232/RS485 communication interface to connect with control centers of solar power plants, so that real-time monitoring of solar panels and inverters can be implemented.

How does it work?

PV Grid Connected Inverters operate at a lower, safer voltage from the PV array, while having the advantages of reliability, flexibility and improved energy yield. Using lower voltages on the PV side means there are lower voltages in your roof eliminating high voltage hazards and giving peace of mind to installers and service personnel.

By using short multiple strings of panels, PV Grid Connected Inverters make sure that there are more paths for electricity to flow, which ensures minimal power loss due to varying environmental or panel conditions.



ON GRID/GRID TIE SOLUTIONS

Single Phase - String Inverter

1kWp, 1.5kWp, 2kWp, 3kWp, 5kWp

Three Phase - String Inverter

10kWp, 20kWp

Three Phase - Central Inverter

50kWp, 100kWp, 250kWp, 500kWp, 630kWp

Grid Tie Inverter

Single Phase - String Inverter

Range - String Inverter - Single Phase: 1kWp & 1.5kWp

Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility.

Product Code: SLR-ST-IN-00000-01500

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 150 to 450 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65
- AC Short-circuit Protection

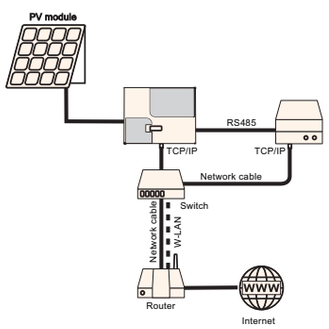
Applications

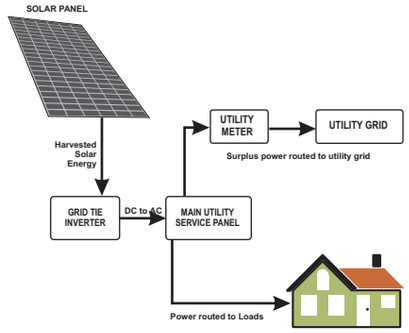
- Residential
- Small commercial

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL





TECHNICAL SPECIFICATIONS

Type Code	SRS - 1kWp & 1.5kWp
Input (DC) Parameters	
Maximum DC input power	1800 W
Maximum DC input voltage	500 Vdc
MPPT operating voltage range	150V - 450V
Maximum input current (per MPP tracker)	11 A
Number of input	1
No. of MPPT tracker	-
Output (AC) Parameters	
Maximum AC output power	1650 W
Rated AC output power	1500 W
Output voltage range	184 to 264 V
Maximum output current	9 A
Rated ouput voltage	220/230/240 Vac
Rated output current	6.8 A
Output frequency range	50/60 Hz (+-5Hz)
Power factor	1
Current Harmonic Distortion (THDi)	< 3%
AC connection	Single Phase
Islanding protection detectiom	Active & Passive
Isolation Principle	No galvanic isolation, transformerless
Efficiency	
Maximum	96%
Euro-eta	95%
MPPT Efficiency	99.90%
Power Consumption	
Standby consumption	< 5 W
Night consumption	< 0.2 W
Environmental limits	
Degree of protection	IP 65
Ambient temperature range	-20 to +60 Celsius
Relative humidity, not condensing	0 to 95%
Maximum altitude (above sea level)	<=2000 m
Ventilation	Natural cooling
Communication	
Liquid Crystal Display (LCD)	4-line character display
Communication interface	RS232/RS485/WLAN & Ethernet (selectable)
Remote Monitoring	Through plug-in GPRS module and viewable remotely through web portal
Protection	
Ground fault monitoring	Yes
Grid monitoring with anti-islanding	Yes
All-pole fault current monitoring unit	Yes
Product Compliance	
Quality Assurance	ISO 9001 certified
EMC standard	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11
Safety	VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL Guideline 2011/CEI0-21, G83/59/EEG2012, AS3100/4777 etc.

Grid Tie Inverter

Single Phase - String Inverter

Range - String Inverter - Single Phase: 2kWp

Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Product Code: SLR-ST-IN-00000-02000

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 150 to 450 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
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- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation.

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65
- AC Short-circuit Protection

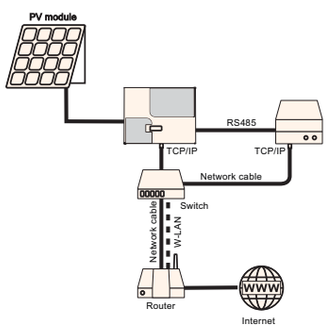
Applications

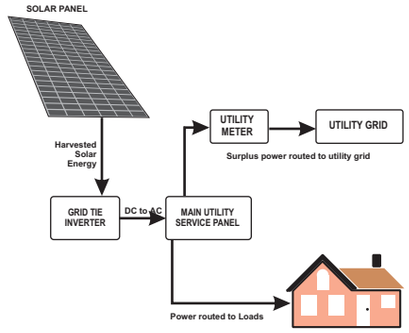
- Residential
- Small & Medium commercial

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL





TECHNICAL SPECIFICATIONS

Type Code	SRS - 2kWp
Input (DC) Parameters	
Maximum DC input power	2400 W
Maximum DC input voltage	500 Vdc
MPPT operating voltage range	150V - 450V
Maximum input current (per MPP tracker)	13 A
Number of input	1
No. of MPPT tracker	1
Output (AC) Parameters	
Maximum AC output power	2200 W
Rated AC output power	2000 W
Output voltage range	184 to 264 V
Maximum output current	11 A
Rated ouput voltage	220/230/240 Vac
Rated output current	9.1 A
Output frequency range	50/60 Hz (+-5Hz)
Power factor	1
Current Harmonic Distortion (THDi)	< 3%
AC connection	Single Phase
Islanding protection detectiom	Active & Passive
Isolation Principle	No galvanic isolation, transformerless
Efficiency	
Maximum	96%
Euro-eta	95%
MPPT Efficiency	99.90%
Power Consumption	
Standby consumption	< 5 W
Night consumption	< 0.2 W
Environmental limits	
Degree of protection	IP 65
Ambient temperature range	-20 to +60 Celsius
Relative humidity, not condensing	0 to 95%
Maximum altitude (above sea level)	<=2000 m
Ventilation	Natural cooling
Communication	
Liquid Crystal Display (LCD)	4-line character display
Communication interface	RS232/RS485/WLAN & Ethernet (selectable)
Remote Monitoring	Through plug-in GPRS module and viewable remotely through web portal
Protection	
Ground fault monitoring	Yes
Grid monitoring with anti-islanding	Yes
All-pole fault current monitoring unit	Yes
Product Compliance	
Quality Assurance	ISO 9001 certified
EMC standard	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11
Safety	VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL Guideline 2011/CEI0-21, G83/59/EEG2012, AS3100/4777 etc.

Grid Tie Inverter

Single Phase - String Inverter

Range - String Inverter - Single Phase: 3kWp

Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Product Code: SLR-ST-IN-00000-03000

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 150 to 450 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation.

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65
- AC Short-circuit Protection

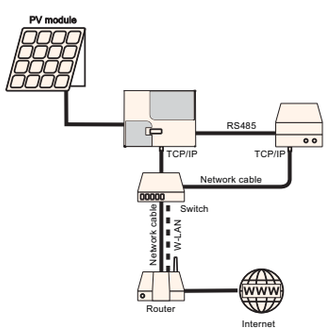
Applications

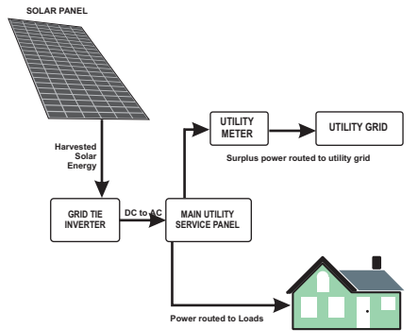
- Residential
- Small & Medium commercial

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL





TECHNICAL SPECIFICATIONS

Type Code	SRS - 3kWp
Input (DC) Parameters	
Maximum DC input power	3300 W
Maximum DC input voltage	500 Vdc
MPPT operating voltage range	150V - 450V
Maximum input current (per MPP tracker)	19 A
Number of input	2
No. of MPPT tracker	1
Output (AC) Parameters	
Maximum AC output power	3100 W
Rated AC output power	3000 W
Output voltage range	184 to 264 V
Maximum output current	15 A
Rated ouput voltage	220/230/240 Vac
Rated output current	13.6 A
Output frequency range	50/60 Hz (+-5Hz)
Power factor	1
Current Harmonic Distortion (THDi)	< 3%
AC connection	Single Phase
Islanding protection detectiom	Active & Passive
Isolation Principle	No galvanic isolation, transformerless
Efficiency	
Maximum	97.50%
Euro-eta	96.50%
MPPT Efficiency	99.90%
Power Consumption	
Standby consumption	< 5 W
Night consumption	< 0.2 W
Environmental limits	
Degree of protection	IP 65
Ambient temperature range	-20 to +60 Celsius
Relative humidity, not condensing	0 to 95%
Maximum altitude (above sea level)	<=2000 m
Ventilation	Natural cooling
Communication	
Liquid Crystal Display (LCD)	4-line character display
Communication interface	RS232/RS485/WLAN & Ethernet (selectable)
Remote Monitoring	Through plug-in GPRS module and viewable remotely through web portal
Protection	
Ground fault monitoring	Yes
Grid monitoring with anti-islanding	Yes
All-pole fault current monitoring unit	Yes
Product Compliance	
Quality Assurance	ISO 9001 certified
EMC standard	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11
Safety	VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL Guideline 2011/CEI0-21, G83/59/EEG2012, AS3100/4777 etc.

Grid Tie Inverter

Single Phase - String Inverter

Range - String Inverter - Single Phase: 5kWp

Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Product Code: SLR-ST-IN-00000-05000

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 150 to 500 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation.

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65

  AC Short-circuit Protection

Applications

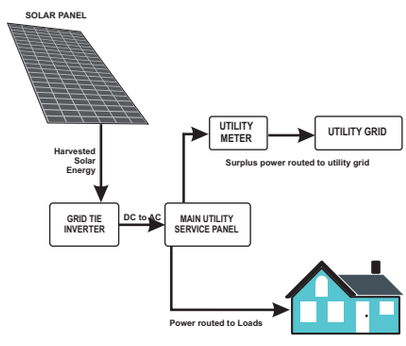
- Residential
- NGOs
- Small & Medium commercial
- Petrol Pumps
- Banks
- Street Light

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type Code	SRS - 5kWp
Input (DC) Parameters	
Maximum DC input power	5500 W
Maximum DC input voltage	600 Vdc
MPPT operating voltage range	150V - 500V
Maximum input current (per MPP tracker)	15A X 2
Number of input	2
No. of MPPT tracker	2
Output (AC) Parameters	
Maximum AC output power	5100 W
Rated AC output power	5000W
Output voltage range	184 to 276 V
Maximum output current	24 A
Rated ouput voltage	230 Vac
Rated output current	21.7 A
Output frequency range	50/60 Hz (+-5Hz)
Power factor	0.9 leading - 0.9 lagging
Current Harmonic Distortion (THDi)	< 3%
AC connection	Single Phase
Islanding protection detectiom	Active & Passive
Isolation Principle	No galvanic isolation, transformerless
Efficiency	
Maximum	>97.6%
Euro-eta	>96.8%
MPPT Efficiency	99.90%
Power Consumption	
Standby consumption	< 7 W
Night consumption	< 0.2 W
Environmental limits	
Degree of protection	IP 65
Ambient temperature range	-20 to +60 Celsius
Relative humidity, not condensing	0 to 95%
Maximum altitude (above sea level)	2000 m
Ventilation	Natural cooling
Communication	
Liquid Crystal Display (LCD)	
Communication interface	RS485 standard, external WiFi or Ethernet device optional
Remote Monitoring	Through plug-in GPRS module and viewable remotely through web portal
Protection	
Ground fault monitoring	Yes
Grid monitoring with anti-islanding	Yes
All-pole fault current monitoring unit	Yes
Product Compliance	
Quality Assurance	ISO 9001 certified
EMC standard	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11
Safety	VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL Guideline 2011/CEI0-21, G83/59/EEG2012, AS3100/4777 etc.

Grid Tie Inverter

Three Phase - String Inverter

Range - String Inverter - Three Phase: 10kWp

Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 250 to 850 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation.

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65

  AC Short-circuit Protection

Applications

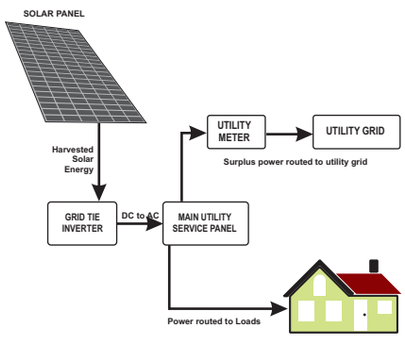
- Educational Institutes
- Medium & Large Commercial
- Hotels
- Petrol Pumps
- Banks
- Hospitals
- NGOs

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type Code	SRS - 10kWp
Input (DC) Parameters	
Maximum DC input power	12000 W
Maximum DC input voltage	900 Vdc
MPPT operating voltage range	250V - 850V
Maximum input current (per MPP tracker)	12A X 3
Number of input	3
No. of MPPT tracker	3
Output (AC) Parameters	
Maximum AC output power	10500 W
Rated AC output power	10000 W
Output voltage range	400Vac +/-20% (adjustable)
Maximum output current	17 A
Rated ouput voltage	400 Vac
Rated output current	15.2 A
Output frequency range	50/60 Hz (+-5Hz)
Power factor	0.9 leading - 0.9 lagging
Current Harmonic Distortion (THDi)	< 3%
AC connection	Three phase
Islanding protection detectiom	Active & Passive
Isolation Principle	No galvanic isolation, transformerless
Efficiency	
Maximum	98.10%
Euro-eta	96.90%
MPPT Efficiency	99.90%
Power Consumption	
Standby consumption	< 10 W
Night consumption	< 2 W
Environmental limits	
Degree of protection	IP 65
Ambient temperature range	-20 to +60 Celsius
Relative humidity, not condensing	0 to 95%
Maximum altitude (above sea level)	2000 m
Ventilation	Wind cooling
Communication	
Liquid Crystal Display (LCD)	4 Lines of LCD, 4 Keys, 4 LEDs
Communication interface	RS485 standard, external WiFi or Ethernet device optional
Remote Monitoring	Through plug-in GPRS module and viewable remotely through web portal
Protection	
Ground fault monitoring	Yes
Grid monitoring with anti-islanding	Yes
All-pole fault current monitoring unit	Yes
Product Compliance	
Quality Assurance	ISO 9001 certified
EMC standard	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11
Safety	VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL Guideline 2011/CEI0-21, G83/59/EEG2012, AS3100/4777 etc.

Grid Tie Inverter

Three Phase - String Inverter

Range - String Inverter - Three Phase: 20kWp

Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 250 to 850 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation.

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65

  AC Short-circuit Protection

Applications

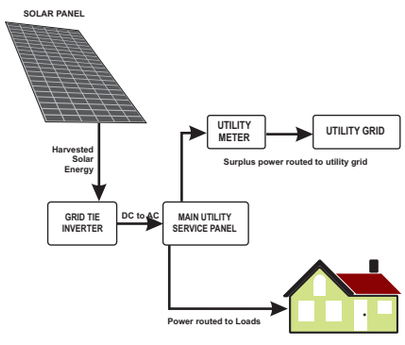
- Educational Institutes
- Large Industries
- Corporate and Institutional
- Petrol Pumps
- Banks
- Hospitals
- Hotels
- Defense

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type Code	SRS - 20kWp
Input Data	20K
Maximum power of battery	22KW
Maximum voltage of direct current	900 V
Rated operational voltage	580 V
Tracking scope of voltage	250 V - 850 V
Maximum tracking quantity of power	3
Maximum input direct current	17A/17A/17A
Output data	
Rated output power of alternating current	20KW
Maximum output current	30A
Allowable voltage scope of grid	323 - 437 V
Allowable frequency scope of grid	50Hz ±5Hz
Wired method	L1/L2/L3+N+PE
THD of output current	<3%
Power factor	0.9 lead lag
Maximum efficiency	98.10%
European efficiency	96.90%
Mechanical data	
Dimension (WxHxD)mm	522x690x210
Weight	46Kg
Protection level	IP65
Cooling method	Wind cooling
Characteristic data	
Communication port	RS485/WLAN Ethernet Selectable)
Available ambient temperature	-20deg C+60
Humidity	0 - 95%, no condensation
Human-machine operation interface	4 lines of LCD, 4 keys, 4 LED

PV Monitoring kit for Grid Tie Inverters

Su-kam Monitoring kit is not only a simple solution provider for PV monitoring, but also serves as a platform to connect end-users, installers/integrators and device manufacturers.

Inverter WiFi/GPRS kit

By collecting information from inverters including status and performance, data loggers make the long-term monitoring of PV systems feasible and efficient. With the easiest and most cost-effective functions, So Communication Inverter Kit enables users to achieve great increase in ROI with only a little investment.

- A variety of communication methods available, including Ethernet, WiFi, GPRS
- Can be connected to up to 64 inverters
- Quick installation and easy operation with "Plug & Play" function
- Additional accessories such as electric meter, irradiation sensor and temperature sensor, etc. can be connected
- Storage of over 25 years
- Remote monitoring via Su-Kam/Customer Portal
- Web Server included, enabling offline access

Su-Kam Monitoring kit aims to make an ecosystem for win-win cooperation, and to create value for various levels in the industrial chain, including end users, installers, distributors and device manufacturers, etc.

End Users

- Monitor PV systems anytime and anywhere
- Evaluate ROI of PV systems
- Immediate detection of malfuncations and defects
- Easy communication with installers
- Easier to get financial support
- Share energy-saving concepts with others

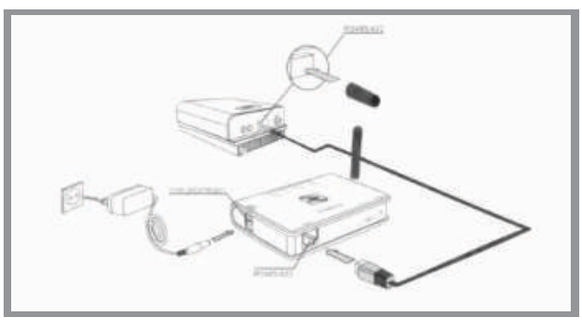
Installers/Integrators

- Remote management of PV systems
- Minimize O&M costs
- Quicker resolution of malfunctions
- Improve customer services
- Enhance competitive advantages of services
- Easy understanding of device performance
- Increase project experience
- Presentation of successful case studies

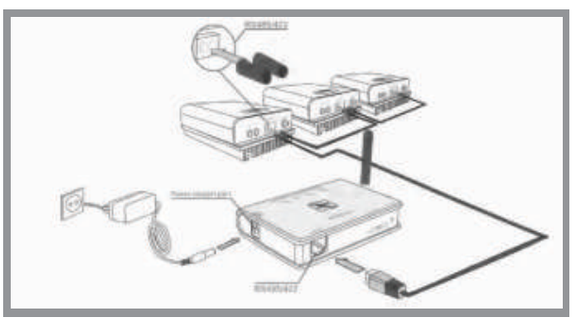
Manufactures

- Remote montioring of devices
- Minimize O&M and service costs
- Obtain performance data of devices
- Enhance competitive advantages
- Understand market distribution of devices
- The best display platform for devices

Connection with Single Inverter



Connection with Multiple Inverters



Grid Tie Inverter

Three Phase - Central Inverter

Range - Central Inverter - Three Phase: 50KWp

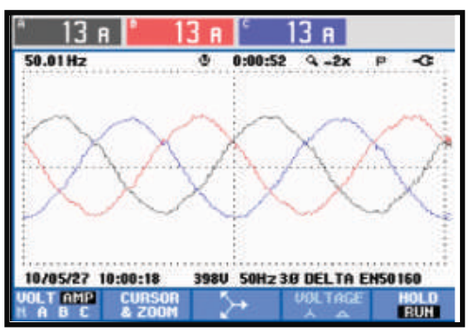
Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

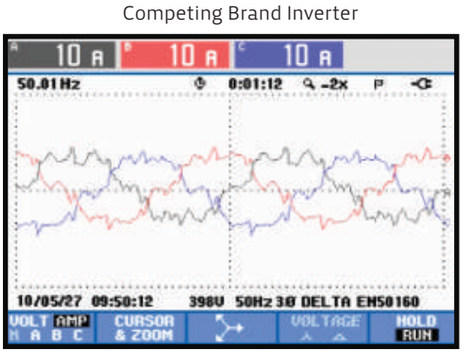
Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Comparison of Total Harmonic Distortion between Radiant and a competing brand at 10% load

Su-kam Radiant Inverter



Competing Brand Inverter



Grid Tie Inverter

Three Phase - Central Inverter

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 450 to 850 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

- Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65 AC Short-circuit Protection

Applications

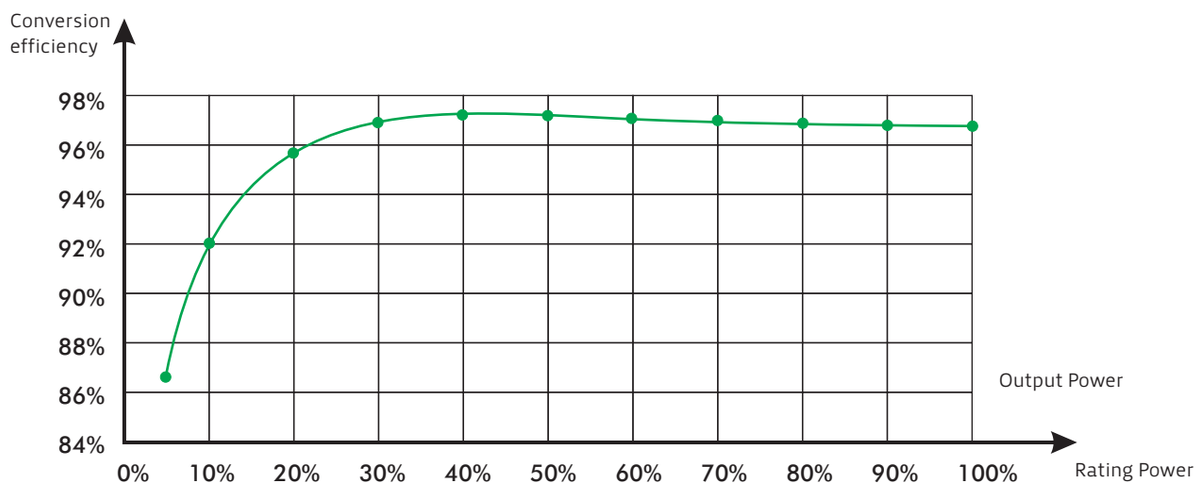
- Educational Institutes
- Large Industries
- Corporate and Institutional
- Petrol Pumps
- Banks
- Hospitals
- Hotels
- Defense

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

HIGH EFFICIENCY EVEN UNDER PART LOAD CONDITIONS



TECHNICAL SPECIFICATIONS

	50kWp
Max DC Input Voltage	900V DC
Max DC Input Power	55kWp
Max Input current	120A
MPPT Tracking Voltage Range	450~850Vdc (Rated voltage 576Vdc)
Max DC input current	120A
Rated Output Power	50 KW
Rated Voltage	270 Vac
Voltage range	(1±15%) x Normal AC Voltage (adjustable ±5%,±10%,±15%,±20%)
Grid Frequency Range	50/ 60Hz (±4.5Hz), (adjustable)
THDi	< 3%
Rated AC output Current	107A
Max AC output Current	118A
Max Efficiency	>98%
Europian Eff	>97%
MPPT Efficiency	>99%
Standby (Night Losses)	<10W
Operating Temperature	-40°C ~ 55°C
Humidity Range	0~95% non condensing
Cooling	Forced Air cooling
Display	LCD
Communicaton	RS485, external Ethernet (optional)
Protection Rating	IP 20
Dimension (WXHXD)	600x1600x945 mm
Weight (KG)	310
Noise	<58 dB(A)
Max Altitude Above See level	3000m

Grid Tie Inverter

Three Phase - Central Inverter

Range - Central Inverter - Three Phase: 100KWp

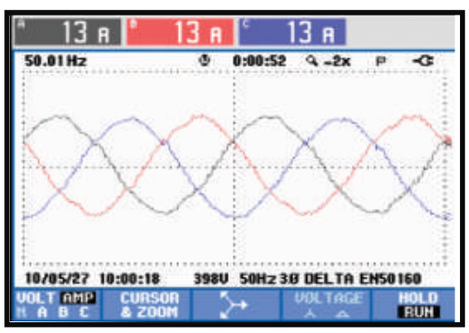
Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

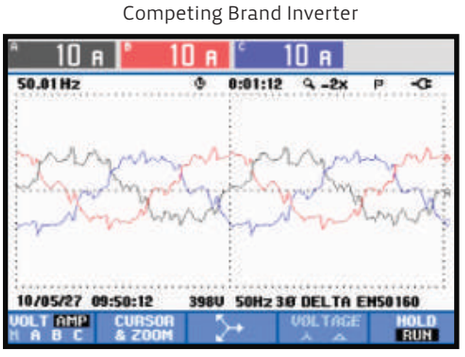
Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Comparison of Total Harmonic Distortion between Radiant and a competing brand at 10% load

Su-kam Radiant Inverter



Competing Brand Inverter



Grid Tie Inverter

Three Phase - Central Inverter

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 450 to 850 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

- Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65 AC Short-circuit Protection

Applications

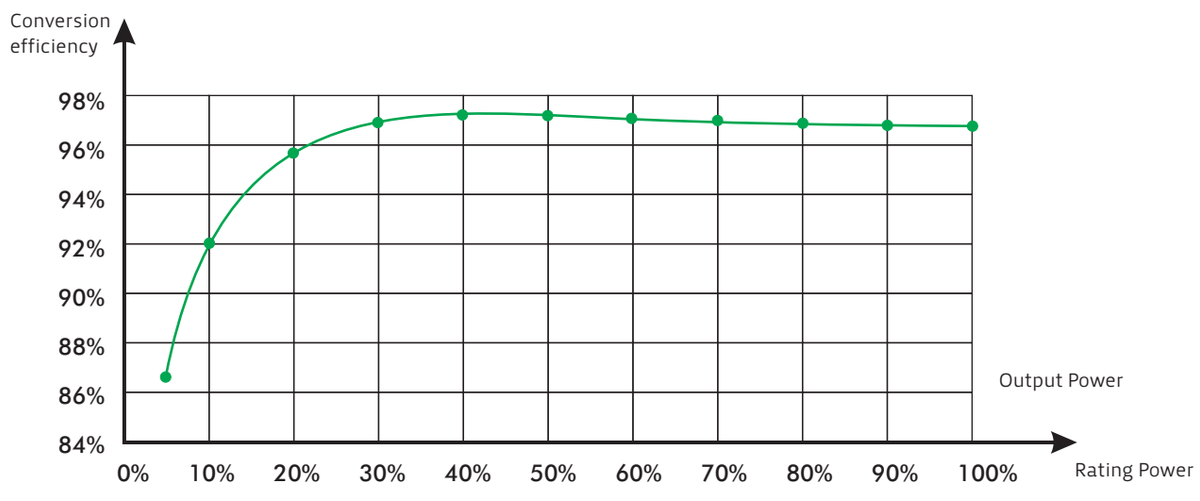
- Educational Institutes
- Large Industries
- Corporate and Institutional
- Petrol Pumps
- Banks
- Hospitals
- Hotels
- Defense

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

HIGH EFFICIENCY EVEN UNDER PART LOAD CONDITIONS



TECHNICAL SPECIFICATIONS

	100kWp
Max DC Input Voltage	900V DC
Max DC Input Power	110kWp
Max Input current	240A
MPPT Tracking Voltage Range	450~850Vdc (Rated voltage 576Vdc)
Max DC input current	240A
Rated Output Power	100 KW
Rated Voltage	270 Vac
Voltage range	(1±15%) x Normal AC Voltage (adjustable ±5%,±10%,±15%,±20%)
Grid Frequency Range	50/ 60Hz (±4.5Hz), (adjustable)
THDi	< 3%
Rated AC output Current	214A
Max AC output Current	234A
Max Efficiency	>98%
Europian Eff	>97%
MPPT Efficiency	>99%
Standby (Night Losses)	<10W
Operating Temperature	-40°C ~ 55°C
Humidity Range	0~95% non condensing
Cooling	Forced Air cooling
Display	LCD
Communicaton	RS485, external Ethernet (optional)
Protection Rating	IP 20
Dimension (WXHXD)	835x1850x945 mm
Weight (KG)	470
Noise	<58 dB(A)
Max Altitude Above See level	3000m

Grid Tie Inverter

Three Phase - Central Inverter

Range - Central Inverter - Three Phase: 250KWp

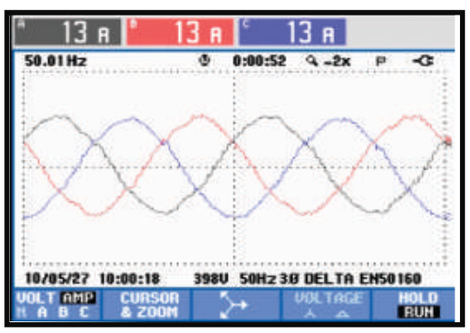
Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

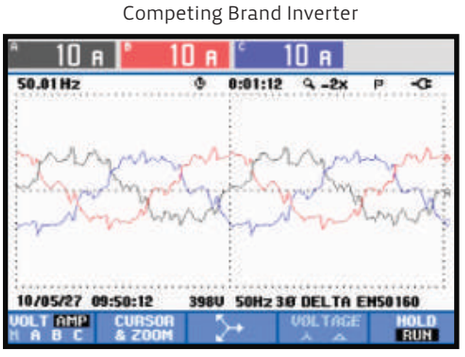
Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Comparison of Total Harmonic Distortion between Radiant and a competing brand at 10% load

Su-kam Radiant Inverter



Competing Brand Inverter



Grid Tie Inverter

Three Phase - Central Inverter

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 450 to 850 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

- Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65 AC Short-circuit Protection

Applications

Applications

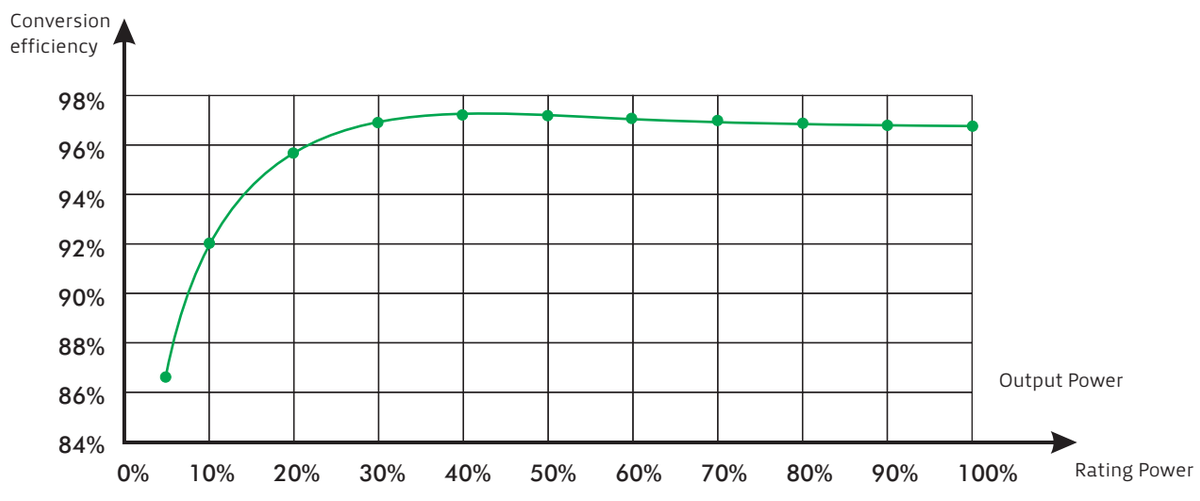
- Educational Institutes
- Large Industries
- Corporate and Institutional
- Petrol Pumps
- Banks
- Hospitals
- Hotels
- Defense

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

HIGH EFFICIENCY EVEN UNDER PART LOAD CONDITIONS



TECHNICAL SPECIFICATIONS

	250kWp
Max DC Input Voltage	900V DC
Max DC Input Power	275kWp
Max Input current	600A
MPPT Tracking Voltage Range	450~850Vdc (Rated voltage 576Vdc)
Max DC input current	600A
Rated Output Power	250 KW
Rated Voltage	270 Vac
Voltage range	(1±15%) x Normal AC Voltage (adjustable ±5%,±10%,±15%,±20%)
Grid Frequency Range	50/ 60Hz (±4.5Hz), (adjustable)
THDi	< 3%
Rated AC output Current	535A
Max AC output Current	588A
Max Efficiency	>98.3%
Europian Eff	>97.8%
MPPT Efficiency	>99%
Standby (Night Losses)	<10W
Operating Temperature	-40°C ~ 55°C
Humidity Range	0~95% non condensing
Cooling	Forced Air cooling
Display	LCD
Communicaton	RS485, external Ethernet (optional)
Protection Rating	IP 20
Dimension (WXHXD)	1200x1850x945 mm
Weight (KG)	815
Noise	<60 dB(A)
Max Altitude Above See level	3000m

Grid Tie Inverter

Three Phase - Central Inverter

Range - Central Inverter - Three Phase: 500kWp

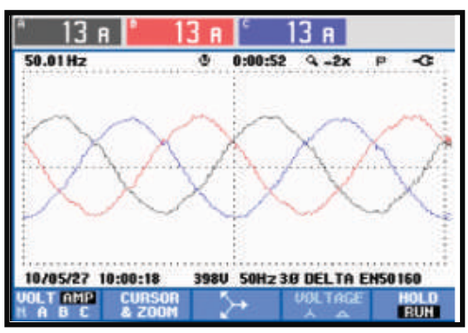
Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

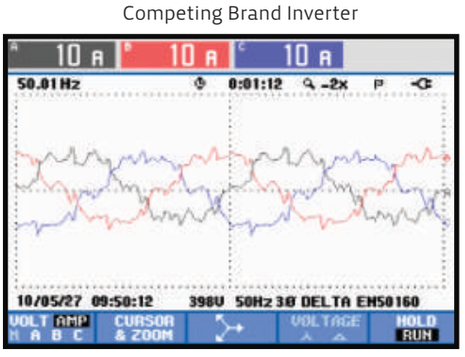
Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Comparison of Total Harmonic Distortion between Radiant and a competing brand at 10% load

Su-kam Radiant Inverter



Competing Brand Inverter



Grid Tie Inverter

Three Phase - Central Inverter

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 450 to 850 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

- Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65 AC Short-circuit Protection

Applications

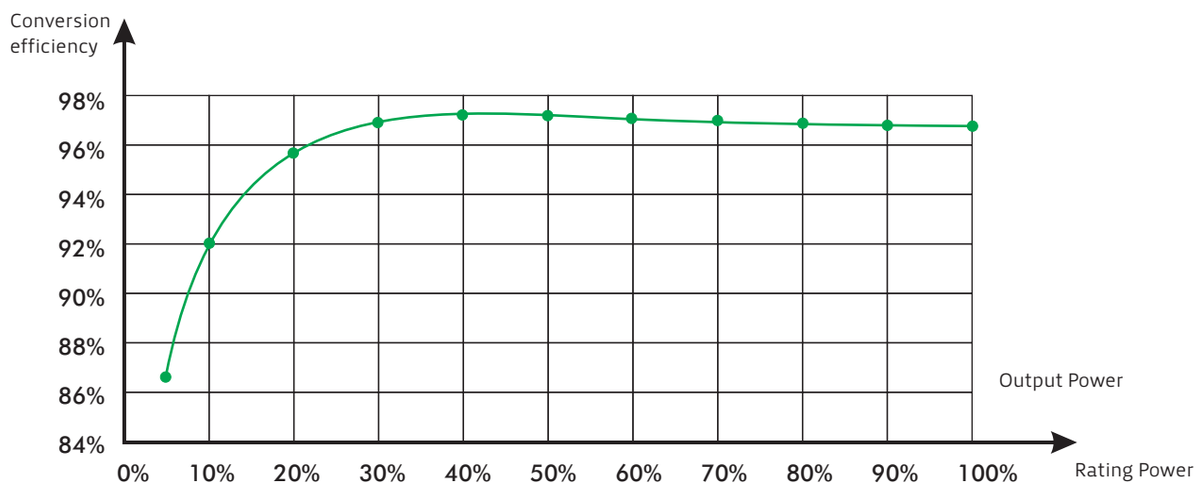
- Educational Institutes
- Large Industries
- Corporate and Institutional
- Petrol Pumps
- Banks
- Hospitals
- Hotels
- Defense

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

HIGH EFFICIENCY EVEN UNDER PART LOAD CONDITIONS



TECHNICAL SPECIFICATIONS

	500kWp
Max DC Input Voltage	900V DC
Max DC Input Power	550kWp
Max Input current	1200A
MPPT Tracking Voltage Range	450~850Vdc (Rated voltage 576Vdc)
Max DC input current	1200A
Rated Output Power	500 KW
Rated Voltage	270 or 315 Vac
Voltage range	(1±15%) x Normal AC Voltage (adjustable ±5%,±10%,±15%,±20%)
Grid Frequency Range	50/ 60Hz (±4.5Hz), (adjustable)
THDi	< 3%
Rated AC output Current	1070 or 916 A
Max AC output Current	1176 or 1007A
Max Efficiency	>98.7%
Europian Eff	>98.2%
MPPT Efficiency	>99%
Standby (Night Losses)	<10W
Operating Temperature	-40°C ~ 55°C
Humidity Range	0~95% non condensing
Cooling	Forced Air cooling
Display	LCD
Communicaton	RS485, external Ethernet (optional)
Protection Rating	IP 20
Dimension (WXHXD)	1600x1850x945 mm
Weight (KG)	1350
Noise	<60 dB(A)
Max Altitude Above See level	3000m

Grid Tie Inverter

Three Phase - Central Inverter

Range - Central Inverter - Three Phase: 630kWp

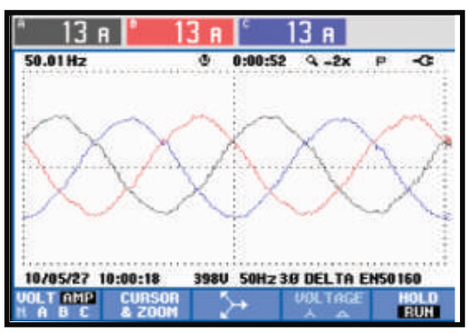
Su-Kam Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic) power into utility-grade electricity that can be utilized by the home or sold to the local power company. Advanced state of art electronics embedded inside the inverter ensures that maximum PV power is converted to AC and delivered to the Utility Grid. These inverters are configured to feed into the LT& HT depending upon the system capacity. These inverters have inbuilt safety anti islanding feature to ensure that the inverter switches off when grid is absent. In order to operate, the Solar Grid Tie Inverter must have grid power available and connected. A wide input voltage range gives the flexibility to the designer to use a large range of PV modules.

Working Principle

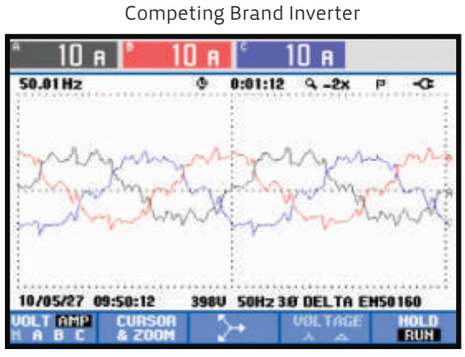
Installing the Grid Tie Solar Inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility

Comparison of Total Harmonic Distortion between Radiant and a competing brand at 10% load

Su-kam Radiant Inverter



Competing Brand Inverter



Grid Tie Inverter

Three Phase - Central Inverter

Feature

- High Total Efficiency – High reliability and efficiency with low auxiliary consumption for rapid return on investment. MPP efficiency > 99.9% ; Maximum efficiency >97.5%
- PV compatibility – Su-Kam Grid Tie inverter is designed to take advantage of solar modules configured as high voltage PV string arrays – with an input voltage Maximum Power Point Range of 450 to 850 Vdc.
- Maximum Power Point Tracking (MPPT) – Su-Kam Grid Tie inverters use Maximum Power point Technology (MPPT) to harvest the maximum amount of energy from the solar array. Provide single and double MPP trackers for different application demands.
- Expandable – Multiple grid tie inverters may be networked together for increased net metering capacity or future system growth. Parallel up to 50 units via RS485 port.
- Advanced grid support functionality – Extensive grid code compatibility and adjustability.
- Proven technology platform – High reliability and long operating life for secured return on investment.
- Compact state of the art design – Transformer less design. Low space requirement, with fast and easy installation and serviceability for reduced overall cost.
- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Robust enclosure, with IP65 rating – Suitable for outdoor installation

Communication Interface & Monitoring Software

- Versatile communication interface – Standard RS485, Rs232
- Monitoring Software – Provides operational status and electricity generated data.

Display

- Liquid crystal display (LCD) providing easy-to-read system status and daily cumulative energy production information.

Protections

- Anti Islanding
- DC reverse polarity protection
- All-pole fault current monitoring unit
- Ground fault monitoring
- Environmental Protection – Ip65 AC Short-circuit Protection

Applications

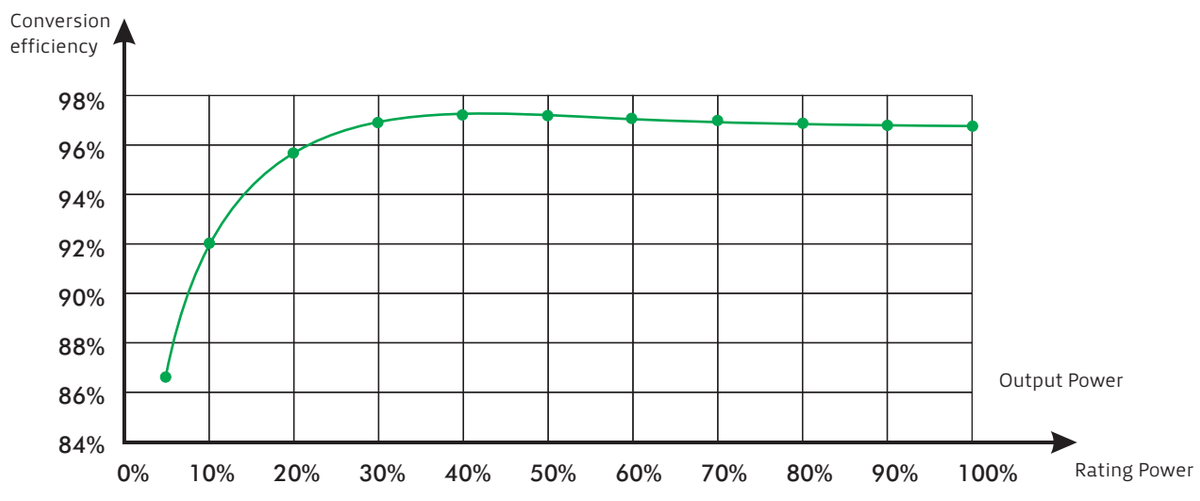
- Educational Institutes
- Large Industries
- Corporate and Institutional
- Petrol Pumps
- Banks
- Hospitals
- Hotels
- Defense

Certifications

EMC standard - EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN55022, EN61000-3-2, EN61000-3-12, EN61000-3-3, EN61000-3-11

Safety - VDE0126-1-1, VDE AR N4105, EN50178, IEC62109, DK5940/ENEL

HIGH EFFICIENCY EVEN UNDER PART LOAD CONDITIONS



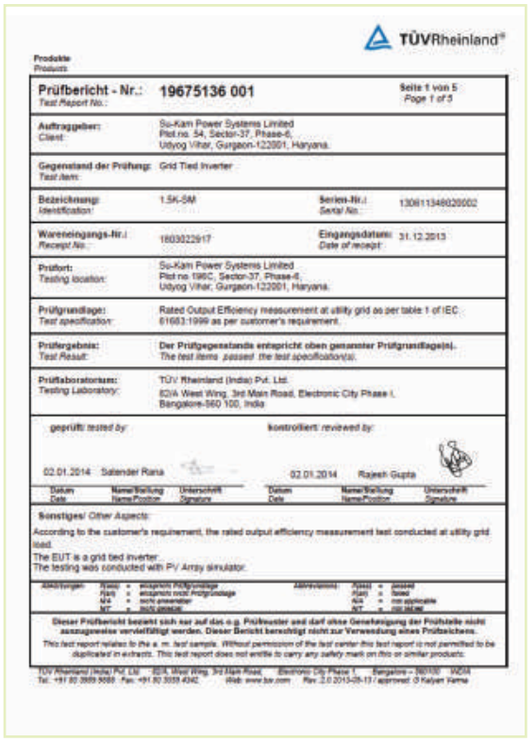
TECHNICAL SPECIFICATIONS

	630kWp
Max DC Input Voltage	1000V DC
Max DC Input Power	690kWp
Max Input current	1200A
MPPT Tracking Voltage Range	450~850Vdc (Rated voltage 576Vdc)
Max DC input current	1440A
Rated Output Power	630 KW
Rated Voltage	315 Vac
Voltage range	(1±15%) x Normal AC Voltage (adjustable ±5%,±10%,±15%,±20%)
Grid Frequency Range	50/ 60Hz (±4.5Hz), (adjustable)
THDi	< 3%
Rated AC output Current	1155A
Max AC output Current	1212A
Max Efficiency	>98.7%
Europian Eff	>98.2%
MPPT Efficiency	>99%
Standby (Night Losses)	<10W
Operating Temperature	-40°C ~ 55°C
Humidity Range	0~95% non condensing
Cooling	Forced Air cooling
Display	LCD
Communicaton	RS485, external Ethernet (optional)
Protection Rating	IP 20
Dimension (WXHXD)	1600x1850x945 mm
Weight (KG)	1370
Noise	<60 dB(A)
Max Altitude Above See level	3000m

Grid Tie Inverter

Test Reports and Certificates

TUV Test Reports



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Prüfbericht - Nr.: 19675136 001
Test Report No.:

Seite 1 von 5
Page 1 of 5

Auftraggeber: *Client:*	Su-Kam Power Systems Limited Plot no. 54, Sector-37, Phase-6, Udyog Vihar, Gurgaon-122001, Haryana.
Gegenstand der Prüfung: *Test item:*	Grid Tied Inverter
Bezeichnung: *Identification:*	1.5K-SM
Serien-Nr.: *Serial No.:*	130811348020002
Wareneingangs-Nr.: *Receipt No.:*	1803022917
Eingangsdatum: *Date of receipt:*	31.12.2013
Prüfort: *Testing location:*	Su-Kam Power Systems Limited Plot no. 196C, Sector-37, Phase-6, Udyog Vihar, Gurgaon-122001, Haryana.
Prüfgrundlage: *Test specification:*	Rated Output Efficiency measurement at utility grid as per table 1 of IEC 61683:1999 as per customer's requirement.
Prüfergebnis: *Test Result:*	**Der Prüfgegenstands entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland (India) Pvt. Ltd. 62/A West Wing, 3rd Main Road, Electronic City Phase I, Bangalore-560 100, India

geprüft: *tested by:* — **kontrolliert:** *reviewed by:*

02.01.2014 Satender Rana — 02.01.2014 Rajesh Gupta

Datum / Date — Name/Stellung / Name/Position — Unterschrift / Signature

Sonstiges/ *Other Aspects:*

According to the customer's requirement, the rated output efficiency measurement test conducted at utility grid load.
The EUT is a grid tied inverter.
The testing was conducted with PV Array simulator.

Abkürzungen: P(ass) = entspricht Prüfgrundlage; F(ail) = entspricht nicht Prüfgrundlage; N/A = nicht anwendbar; N/T = nicht getestet
Abbreviations: P(ass) = passed; F(ail) = failed; N/A = not applicable; N/T = not tested

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

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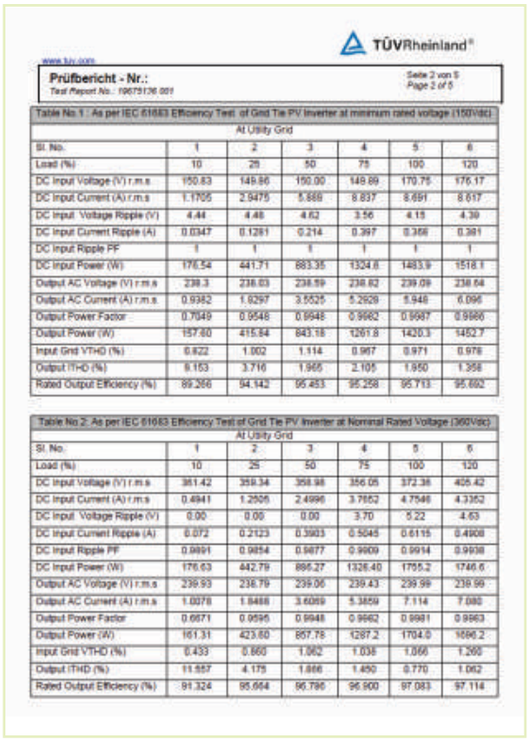
Tel.: +91 80 3939 9000 · Fax: +91 80 3939 4042 · Web: www.tuv.com · Rev. 2.0 2013-08-13 / approved: © Kalyan Verma



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Prüfbericht - Nr.:
Test Report No.: 19675136 001

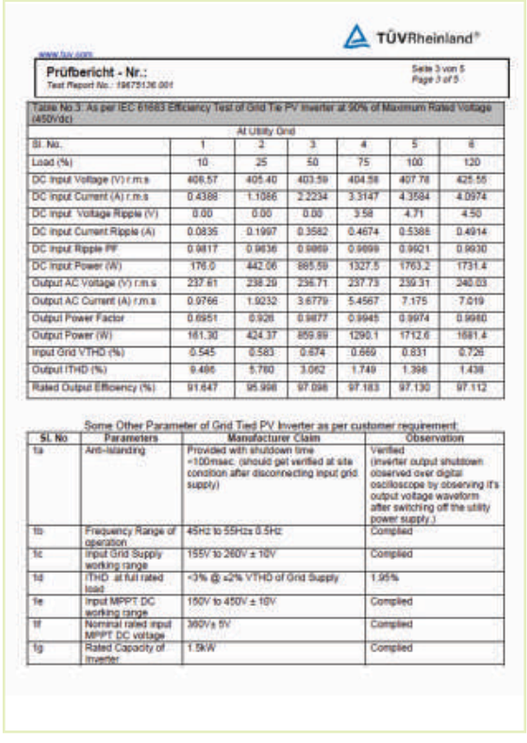
Seite 2 von 5
Page 2 of 5

Table No.1 : As per IEC 61683 Efficiency Test of Grid Tie PV Inverter at minimum rated voltage (150Vdc)

At Utility Grid						
Sl. No.	1	2	3	4	5	6
Load (%)	10	25	50	75	100	120
DC Input Voltage (V) r.m.s	150.83	149.86	150.00	149.89	170.75	176.17
DC Input Current (A) r.m.s	1.1705	2.9475	5.886	8.837	8.691	8.617
DC Input Voltage Ripple (V)	4.44	4.46	4.62	3.56	4.15	4.39
DC Input Current Ripple (A)	0.0347	0.1261	0.214	0.397	0.368	0.381
DC Input Ripple PF	1	1	1	1	1	1
DC Input Power (W)	176.54	441.71	883.35	1324.8	1483.9	1518.1
Output AC Voltage (V) r.m.s	238.3	238.03	238.59	238.82	239.09	238.64
Output AC Current (A) r.m.s	0.9362	1.8297	3.5525	5.2929	5.948	6.096
Output Power Factor	0.7049	0.9548	0.9948	0.9962	0.9987	0.9986
Output Power (W)	157.60	415.84	843.18	1261.8	1420.3	1452.7
Input Grid VTHD (%)	0.822	1.002	1.114	0.967	0.971	0.978
Output ITHD (%)	9.153	3.716	1.965	2.105	1.950	1.358
Rated Output Efficiency (%)	89.266	94.142	95.483	95.258	95.713	95.602

Table No.2: As per IEC 61683 Efficiency Test of Grid Tie PV Inverter at Nominal Rated Voltage (360Vdc)

At Utility Grid						
Sl. No.	1	2	3	4	5	6
Load (%)	10	25	50	75	100	120
DC Input Voltage (V) r.m.s	361.42	359.34	358.98	356.05	372.36	405.42
DC Input Current (A) r.m.s	0.4941	1.2505	2.4996	3.7652	4.7546	4.3352
DC Input Voltage Ripple (V)	0.00	0.00	0.00	3.70	5.22	4.63
DC Input Current Ripple (A)	0.072	0.2123	0.3903	0.5045	0.6115	0.4908
DC Input Ripple PF	0.9991	0.9954	0.9877	0.9909	0.9914	0.9938
DC Input Power (W)	176.63	442.79	896.27	1326.40	1755.2	1746.6
Output AC Voltage (V) r.m.s	239.93	238.79	239.06	239.43	239.99	239.99
Output AC Current (A) r.m.s	1.0078	1.8468	3.6089	5.3859	7.114	7.080
Output Power Factor	0.6671	0.9595	0.9948	0.9962	0.9981	0.9963
Output Power (W)	161.31	423.60	857.78	1287.2	1704.0	1696.2
Input Grid VTHD (%)	0.433	0.860	1.062	1.038	1.066	1.260
Output ITHD (%)	11.557	4.175	1.866	1.450	0.770	1.062
Rated Output Efficiency (%)	91.324	95.664	95.786	96.900	97.083	97.114



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Page 3 of 5

Table No.3: As per IEC 61683 Efficiency Test of Grid Tie PV Inverter at 90% of Maximum Rated Voltage (450Vdc)

At Utility Grid						
Sl. No.	1	2	3	4	5	6
Load (%)	10	25	50	75	100	120
DC Input Voltage (V) r.m.s	406.57	405.40	403.59	404.58	407.78	425.55
DC Input Current (A) r.m.s	0.4388	1.1086	2.2234	3.3147	4.3584	4.0974
DC Input Voltage Ripple (V)	0.00	0.00	0.00	3.58	4.71	4.50
DC Input Current Ripple (A)	0.0835	0.1997	0.3582	0.4674	0.5388	0.4914
DC Input Ripple PF	0.9817	0.9636	0.9869	0.9899	0.9921	0.9930
DC Input Power (W)	176.0	442.06	885.59	1327.5	1763.2	1731.4
Output AC Voltage (V) r.m.s	237.61	238.29	236.71	237.73	239.31	240.03
Output AC Current (A) r.m.s	0.9766	1.9232	3.6779	5.4567	7.175	7.019
Output Power Factor	0.6951	0.926	0.9877	0.9945	0.9974	0.9960
Output Power (W)	161.30	424.37	859.89	1290.1	1712.6	1681.4
Input Grid VTHD (%)	0.545	0.583	0.674	0.669	0.831	0.726
Output ITHD (%)	9.486	5.780	3.062	1.749	1.398	1.438
Rated Output Efficiency (%)	91.647	95.998	97.096	97.183	97.130	97.112

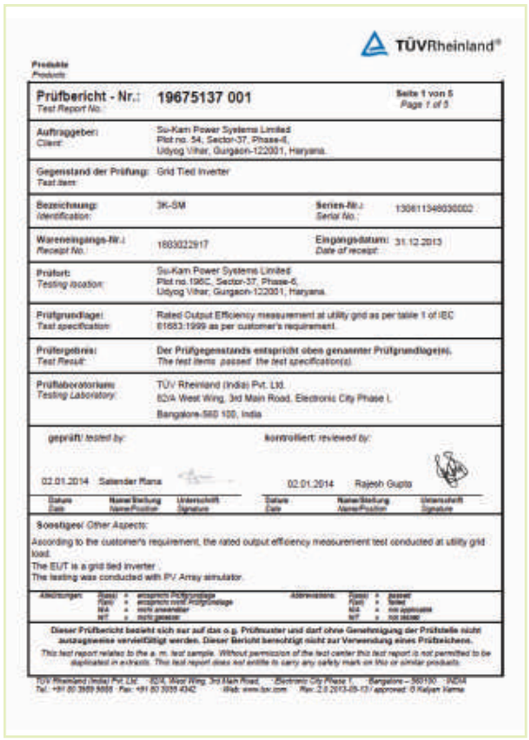
Some Other Parameter of Grid Tied PV Inverter as per customer requirement:

Sl. No	Parameters	Manufacturer Claim	Observation
1a	Anti-islanding	Provided with shutdown time <100msec. (should get verified at site condition after disconnecting input grid supply)	Verified (inverter output shutdown observed over digital oscilloscope by observing it's output voltage waveform after switching off the utility power supply.)
1b	Frequency Range of operation	45Hz to 55Hz± 0.5Hz	Complied
1c	Input Grid Supply working range	155V to 260V ± 10V	Complied
1d	ITHD at full rated load	<3% @ ±2% VTHD of Grid Supply	1.95%
1e	Input MPPT DC working range	150V to 450V ± 10V	Complied
1f	Nominal rated input MPPT DC voltage	360V± 5V	Complied
1g	Rated Capacity of Inverter	1.5kW	Complied

Grid Tie Inverter

Test Reports and Certificates

TUV Test Reports



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Prüfbericht - Nr.: 19675137 001
Test Report No.:

Seite 1 von 5
Page 1 of 5

Auftraggeber: Client:	Su-Kam Power Systems Limited Plot no. 54, Sector-37, Phase-II, Udyog Vihar, Gurgaon-122001, Haryana.
Gegenstand der Prüfung: Test item:	Grid Tied Inverter
Bezeichnung: Identification:	3K-SM — Serien-Nr.: Serial No.: 130611346030002
Wareneingangs-Nr.: Receipt No.:	1803022917 — Eingangsdatum: Date of receipt: 31.12.2013
Prüfort: Testing location:	Su-Kam Power Systems Limited Plot no.196C, Sector-37, Phase-6, Udyog Vihar, Gurgaon-122001, Haryana.
Prüfgrundlage: Test specification:	Rated Output Efficiency measurement at utility grid as per table 1 of IEC 61683:1999 as per customer's requirement.
Prüfergebnis: Test Result:	Der Prüfgegenstands entspricht oben genannter Prüfgrundlage(n). The test items passed the test specification(s).
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland (India) Pvt. Ltd. 62/A West Wing, 3rd Main Road, Electronic City Phase I, Bangalore-560 100, India

geprüft/ tested by: — kontrolliert/ reviewed by:

02.01.2014 Satender Rana — 02.01.2014 Rajesh Gupta

Sonstiges/ Other Aspects:

According to the customer's requirement, the rated output efficiency measurement test conducted at utility grid load.
The EUT is a grid tied inverter .
The testing was conducted with PV Array simulator.

Abkürzungen: P(pass) = entspricht Prüfgrundlage; F(fail) = fehlerhaft; N/A = nicht anwendbar; N/T = nicht getestet
Abbreviations: P(pass) = passed; F(fail) = failed; N/A = not applicable; N/T = not tested

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
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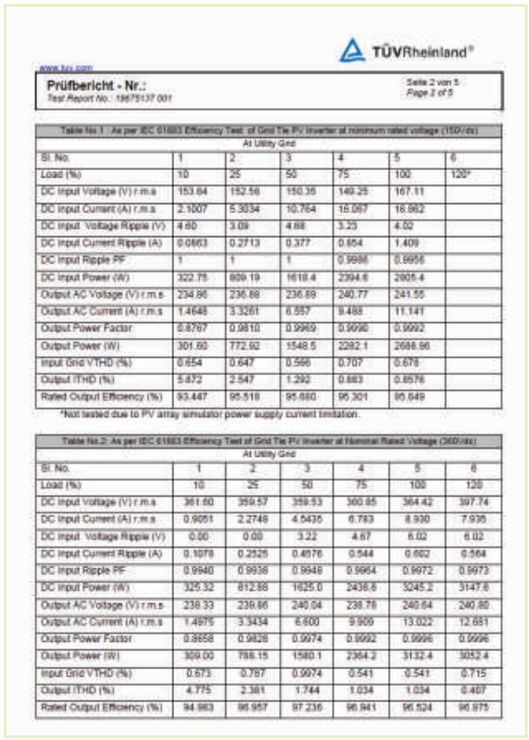
Tel.: +91 80 3988 8888 Fax: +91 80 3988 4342 Web: www.tuv.com Rev. 2.0 2013-05-13/ approved: G Kalyan Varma



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Test Report No.: 19675137 001

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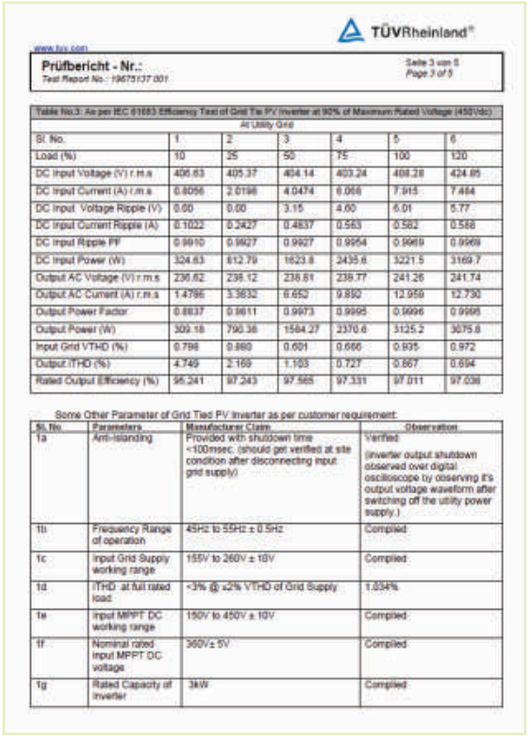
Table No.1 : As per IEC 61683 Efficiency Test of Grid Tie PV Inverter at minimum rated voltage (150Vdc)

At Utility Grid						
Sl. No.	1	2	3	4	5	6
Load (%)	10	25	50	75	100	120*
DC Input Voltage (V) r.m.s	153.64	152.58	150.35	149.25	167.11	
DC Input Current (A) r.m.s	2.1007	5.3034	10.764	15.097	18.882	
DC Input Voltage Ripple (V)	4.60	3.09	4.68	3.23	4.02	
DC Input Current Ripple (A)	0.0863	0.2713	0.377	0.854	1.409	
DC Input Ripple PF	1	1	1	0.9986	0.9956	
DC Input Power (W)	322.75	809.19	1618.4	2394.6	2805.4	
Output AC Voltage (V) r.m.s	234.86	236.88	236.89	240.77	241.55	
Output AC Current (A) r.m.s	1.4648	3.3261	6.557	9.488	11.141	
Output Power Factor	0.8767	0.9810	0.9969	0.9990	0.9992	
Output Power (W)	301.60	772.92	1548.5	2282.1	2688.96	
Input Grid VTHD (%)	0.654	0.647	0.566	0.707	0.678	
Output ITHD (%)	5.872	2.547	1.292	0.883	0.8576	
Rated Output Efficiency (%)	93.447	95.518	95.880	95.301	95.849	

*Not tested due to PV array simulator power supply current limitation.

Table No.2: As per IEC 61683 Efficiency Test of Grid Tie PV Inverter at Nominal Rated Voltage (360Vdc)

At Utility Grid						
Sl. No.	1	2	3	4	5	6
Load (%)	10	25	50	75	100	120
DC Input Voltage (V) r.m.s	361.60	359.57	359.53	360.85	364.42	367.74
DC Input Current (A) r.m.s	0.9051	2.2748	4.5435	6.783	8.930	7.935
DC Input Voltage Ripple (V)	0.00	0.00	3.22	4.67	6.02	6.02
DC Input Current Ripple (A)	0.1078	0.2525	0.4576	0.544	0.662	0.564
DC Input Ripple PF	0.9940	0.9938	0.9948	0.9964	0.9972	0.9973
DC Input Power (W)	325.32	812.88	1625.0	2438.8	3245.2	3147.8
Output AC Voltage (V) r.m.s	238.33	239.86	240.04	238.78	240.64	240.80
Output AC Current (A) r.m.s	1.4975	3.3454	6.600	9.909	13.022	12.881
Output Power Factor	0.9858	0.9828	0.9974	0.9992	0.9996	0.9996
Output Power (W)	309.00	788.15	1580.1	2364.2	3132.4	3052.4
Input Grid VTHD (%)	0.673	0.787	0.9974	0.541	0.541	0.715
Output ITHD (%)	4.775	2.381	1.744	1.034	1.034	0.407
Rated Output Efficiency (%)	94.983	96.957	97.236	96.941	96.524	96.975



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Prüfbericht - Nr.:
Test Report No.: 19675137 001

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Table No.3: As per IEC 61683 Efficiency Test of Grid Tie PV Inverter at 90% of Maximum Rated Voltage (450Vdc)

At Utility Grid						
Sl. No.	1	2	3	4	5	6
Load (%)	10	25	50	75	100	120
DC Input Voltage (V) r.m.s	406.63	405.37	404.14	403.24	408.28	424.85
DC Input Current (A) r.m.s	0.8056	2.0198	4.0474	6.056	7.915	7.484
DC Input Voltage Ripple (V)	0.00	0.00	3.15	4.60	6.01	5.77
DC Input Current Ripple (A)	0.1022	0.2427	0.4837	0.583	0.582	0.588
DC Input Ripple PF	0.9910	0.9927	0.9927	0.9954	0.9969	0.9969
DC Input Power (W)	324.63	812.79	1623.8	2435.6	3221.5	3169.7
Output AC Voltage (V) r.m.s	236.62	236.12	236.81	239.77	241.26	241.74
Output AC Current (A) r.m.s	1.4796	3.3832	6.652	9.892	12.959	12.730
Output Power Factor	0.8837	0.9811	0.9973	0.9995	0.9996	0.9996
Output Power (W)	309.18	790.36	1584.27	2370.6	3125.2	3075.8
Input Grid VTHD (%)	0.798	0.860	0.601	0.666	0.935	0.972
Output ITHD (%)	4.749	2.169	1.103	0.727	0.867	0.694
Rated Output Efficiency (%)	95.241	97.243	97.565	97.331	97.011	97.038

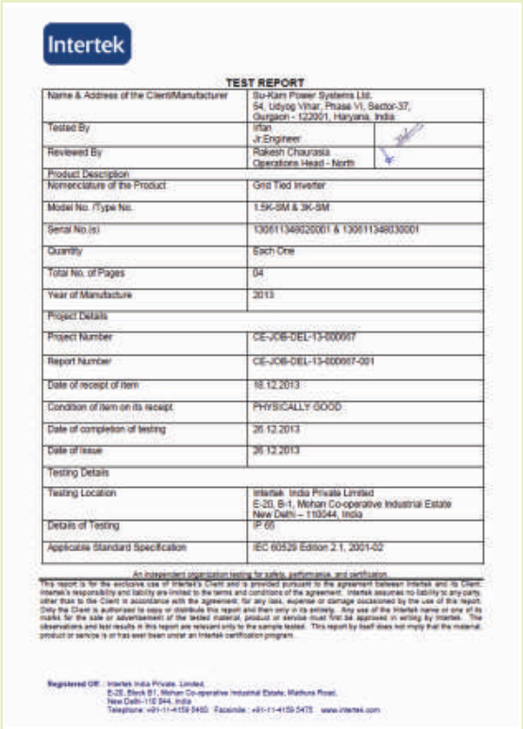
Some Other Parameter of Grid Tied PV Inverter as per customer requirement:

Sl. No.	Parameters	Manufacturer Claim	Observation
1a	Anti-islanding	Provided with shutdown time <100msec. (should get verified at site condition after disconnecting input grid supply)	Verified (inverter output shutdown observed over digital oscilloscope by observing it's output voltage waveform after switching off the utility power supply.)
1b	Frequency Range of operation	45Hz to 55Hz ± 0.5Hz	Complied
1c	Input Grid Supply working range	155V to 260V ± 10V	Complied
1d	ITHD at full rated load	<3% @ ±2% VTHD of Grid Supply	1.034%
1e	Input MPPT DC working range	150V to 450V ± 10V	Complied
1f	Nominal rated input MPPT DC voltage	360V± 5V	Complied
1g	Rated Capacity of Inverter	3kW	Complied

Grid Tie Inverter

Test Reports and Certificates

Intertek Test Reports



Intertek

TEST REPORT

Name & Address of the Client/Manufacturer	Su-Kam Power Systems Ltd. 54, Udyog Vihar, Phase VI, Sector-37, Gurgaon - 122001, Haryana, India
Tested By	Irfan Jr.Engineer
Reviewed By	Rakesh Chaurasia Operations Head - North
Product Description	
Nomenclature of the Product	Grid Tied Inverter
Model No. /Type No.	1.5K-SM & 3K-SM
Serial No.(s)	130611348020001 & 130611348030001
Quantity	Each One
Total No. of Pages	04
Year of Manufacture	2013
Project Details	
Project Number	CE-JOB-DEL-13-000997
Report Number	CE-JOB-DEL-13-000997-001
Date of receipt of item	18.12.2013
Condition of item on its receipt	PHYSICALLY GOOD
Date of completion of testing	26.12.2013
Date of Issue	26.12.2013
Testing Details	
Testing Location	Intertek India Private Limited E-20, B-1, Mohan Co-operative Industrial Estate New Delhi – 110044, India
Details of Testing	IP 65
Applicable Standard Specification	IEC 60529 Edition 2.1, 2001-02

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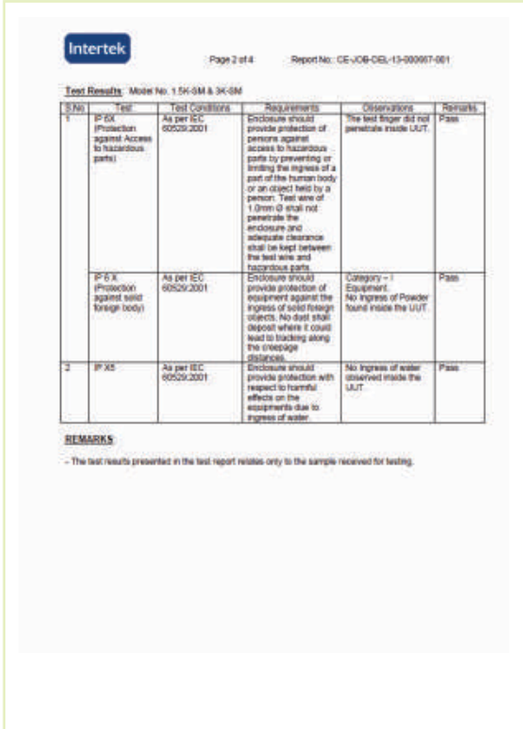

Intertek

Page 2 of 4 Report No.: CE-JOB-DEL-13-000997-001

Test Results Model No. 1.5K-SM & 3K-SM

S.No.	Test	Test Conditions	Requirements	Observations	Remarks
1	IP 6X (Protection against Access to hazardous parts)	As per IEC 60529:2001	Enclosure should provide protection of persons against access to hazardous parts by preventing or limiting the ingress of a part of the human body or an object held by a person. Test wire of 1.0mm Ø shall not penetrate the enclosure and adequate clearance shall be kept between the test wire and hazardous parts.	The test finger did not penetrate inside UUT.	Pass
	IP 6 X (Protection against solid foreign body)	As per IEC 60529:2001	Enclosure should provide protection of equipment against the ingress of solid foreign objects. No dust shall deposit where it could lead to tracking along the creepage distances.	Category – I Equipment. No Ingress of Powder found inside the UUT.	Pass
2	IP X5	As per IEC 60529:2001	Enclosure should provide protection with respect to harmful effects on the equipments due to ingress of water.	No Ingress of water observed inside the UUT.	Pass

REMARKS

- The test results presented in the test report relates only to the sample received for testing.

Government of India Test Reports

Form No. : TRF-2008

ERTL(N)/90(4)-(2013-14)/CR799

Date : 18 / 12 / 13

परीक्षण रिपोर्ट
TEST REPORT

STQC

सत्यमेव जयते

भारत सरकार
Government of India
संचार व सूचना प्रौद्योगिकी मंत्रालय
Ministry of Communications & Information Technology
सूचना प्रौद्योगिकी विभाग
Department of Information Technology

मानकीकरण परीक्षण एवं गुणवत्ता प्रमाणन निदेशालय
Standardisation Testing and Quality Certification Directorate
इलेक्ट्रॉनिकी क्षेत्रीय परीक्षण प्रयोगशाला (उत्तर)
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
(एन एच आई प्रयोगशाला आई ई सी स्कीम के तहत, आई ई सी ई ई - सी बी तथा एन ए बी एल द्वारा मान्यताप्राप्त प्रयोगशाला)
[NBI Laboratory under IECQ, IECEE-CB & NABL Accredited Laboratory]
एस-ब्लॉक, ओखला औद्योगिक क्षेत्र फेज-II, नई दिल्ली ११००२०

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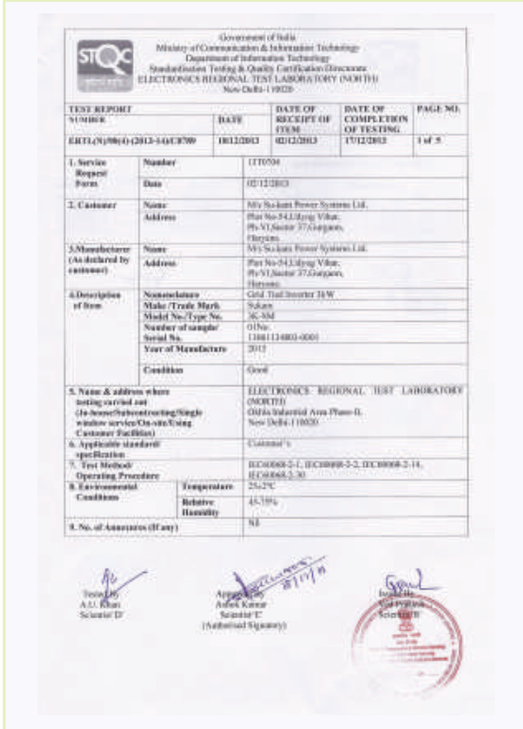
26386205, 26386116, 26384400
Phone : +91(11) 26386210, 26386208
26386205, 26386116, 26384400



Government of India
Ministry of Communication & Information Technology
Department of Information Technology
Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

TEST REPORT NUMBER	DATE	DATE OF RECEIPT OF ITEM	DATE OF COMPLETION OF TESTING	PAGE NO.
ERTL(N)/90(4)-(2013-14)/CR799	18/12/2013	02/12/2013	17/12/2013	1 of 5

1. Service Request Form	Number	1370704
	Date	02/12/2013
2. Customer	Name	M/s Su-kam Power Systems Ltd.
	Address	Plot No-54,Udyog Vihar, Ph-VI,Sector 37,Gurgaon, Haryana.
3.Manufacturer (As declared by customer)	Name	M/s Su-kam Power Systems Ltd.
	Address	Plot No-54,Udyog Vihar, Ph-VI,Sector 37,Gurgaon, Haryana.
4.Description of Item	Nomenclature	Grid Tied Inverter 3kW
	Make /Trade Mark	Su-kam
	Model No./Type No.	3K-SM
	Number of sample/ Serial No.	01Nos. 130611348030001
	Year of Manufacture	2013
	Condition	Good
5. Name & address where testing carried out (In-house/Subcontracting/Single window service/On-site/Using Customer Facilities)		ELECTRONICS REGIONAL TEST LABORATORY (NORTH) Okhla Industrial Area Phase-II, New Delhi-110020
6. Applicable standard/ specification		Customer's
7. Test Method/ Operating Procedure		IEC60068-2-1, IEC60068-2-2, IEC60068-2-14, IEC60068-2-30
8. Environmental Conditions	Temperature	25±2°C
	Relative Humidity	45-55%
9. No. of Annexures (If any)		Nil

Tested By
A.U. Khan
Scientist 'D'

Approved By
Ashok Kumar
Scientist 'C'
(Authorised Signatory)

Government of India Test Reports

Government of India
Ministry of Communication & Information Technology
Department of Information Technology
Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2013-14)/C0789	10/12/2013	2 of 5

10. Details of Major Equipment used :

Sl. No.	Nomenclature	Make	Model/ Type No.	Calibration Valid up to
1	Power Analyser	Voltech	PM6000	06/11/2014
2	Climatic Test Chamber	Weiss Tech.	C340.40	10/12/2014
3	Climatic Test Chamber	Weiss Tech	WK1000/70	15/11/2014

Tested By
A.U. Khan
Scientist'D'

Issued By
Ved Prakash
Scientist'B'

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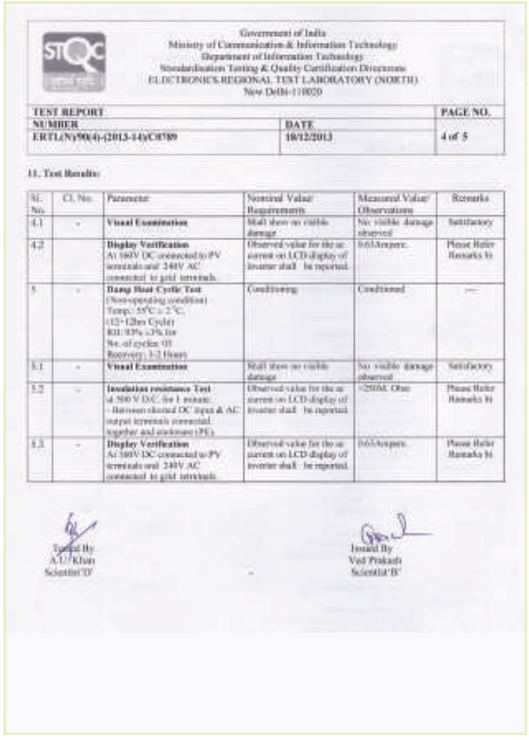
TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2013-14)/C0789	10/12/2013	3 of 5

11. Test Results:

Sl. No.	Clause No.	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
1	–	**Display Verification** At 160V DC connected to PV terminals and 240V AC connected to grid terminals.	Observed value for the ac current on LCD display of inverter shall be reported.	0.63Ampere.	Please Refer Remarks b)
2	Test A, Clause no. 6	**Cold Test** (Non-operating condition) Temp.: -10 0C± 3.0C Duration: 96 Hours Recovery: 1-2 Hours	Conditioning	Conditioned	—
2.1	–	**Visual Examination**	Shall show no visible damage	No visible damage observed	Satisfactory
2.2	–	**Display Verification** At 160V DC connected to PV terminals and 240V AC connected to grid terminals.	Observed value for the ac current on LCD display of inverter shall be reported.	0.63Ampere.	Please Refer Remarks b)
3	Test B, Clause no. 6	**Dry Heat Test** (Non-operating condition) Temp: 55 °C± 2°C Duration: 96 Hours Recovery: 1-2 Hours	Conditioning	Conditioned	—
3.1	–	**Visual Examination**	Shall show no visible damage	No visible damage observed	Satisfactory
3.2	–	**Display Verification** At 160V DC connected to PV terminals and 240V AC connected to grid terminals.	Observed value for the ac current on LCD display of inverter shall be reported.	0.63Ampere.	Please Refer Remarks b)
4	Test N, Clause no. 8	**Change of Temperature Test** -5°C & 55°C (Non-operating condition) Duration: 03 at each temperature Rate of change of temperature: 3°C/Min. No. of cycles: 05	Conditioning	Conditioned	—

Tested By
A.U. Khan
Scientist'D'

Issued By
Ved Prakash
Scientist'B'



Government of India
Ministry of Communication & Information Technology
Department of Information Technology
Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2013-14)/C0789	10/12/2013	4 of 5

11. Test Results:

Sl. No.	Cl. No.	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
4.1	-	**Visual Examination**	Shall show no visible damage	No visible damage observed	Satisfactory
4.2		**Display Verification** At 160V DC connected to PV terminals and 240V AC connected to grid terminals.	Observed value for the ac current on LCD display of inverter shall be reported.	0.63Ampere.	Please Refer Remarks b)
5	-	**Damp Heat Cyclic Test** (Non-operating condition) Temp.: 55°C ± 2°C, (12+12hrs Cycle) RH: 93% ±3% for No. of cycles: 03 Recovery: 1-2 Hours	Conditioning	Conditioned	—
5.1	-	**Visual Examination**	Shall show no visible damage	No visible damage observed	Satisfactory
5.2	-	**Insulation resistance Test** at 500 V D.C. for 1 minute. - Between shorted DC input & AC output terminals connected together and enclosure (PE).	Observed value for the ac current on LCD display of inverter shall be reported.	>250M. Ohm	Please Refer Remarks b)
5.3	-	**Display Verification** At 160V DC connected to PV terminals and 240V AC connected to grid terminals.	Observed value for the ac current on LCD display of inverter shall be reported.	0.63Ampere.	Please Refer Remarks b)

Tested By
A.U. Khan
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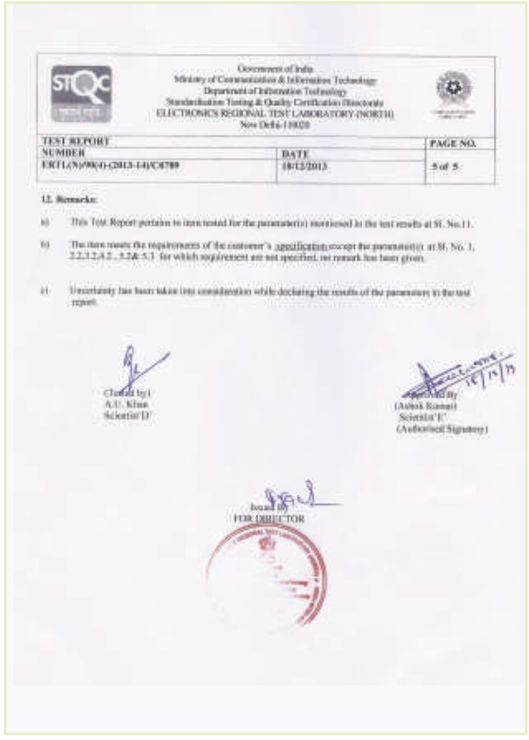

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New Delhi-110020

TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2013-14)/C0789	10/12/2013	5 of 5

12. Remarks:

a) This Test Report pertains to item tested for the parameter(s) mentioned in the test results at Sl. No.11.

b) The item meets the requirements of the customer's specification except the parameter(s) at Sl. No. 1, 2.2,3.2,4.2 , 5.2& 5.3 for which requirement are not specified, no remark has been given.

c) Uncertainty has been taken into consideration while declaring the results of the parameters in the test report.

Checked by
A.U. Khan
Scientist'D'

Approved By
(Ashok Kumar)
Scientist'E'
(Authorised Signatory)

Issued By
FOR DIRECTOR

Grid Tie Inverter

Test Reports and Certificates

Government of India Test Reports

परीक्षण रिपोर्ट
TEST REPORT

Government of India
Ministry of Communications & Information Technology
Department of Information Technology
Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)

8-Block, Okhla Industrial Area, Phase-II, New Delhi-110020
INDIA

Government of India
Ministry of Communication & Information Technology
Department of Information Technology
Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

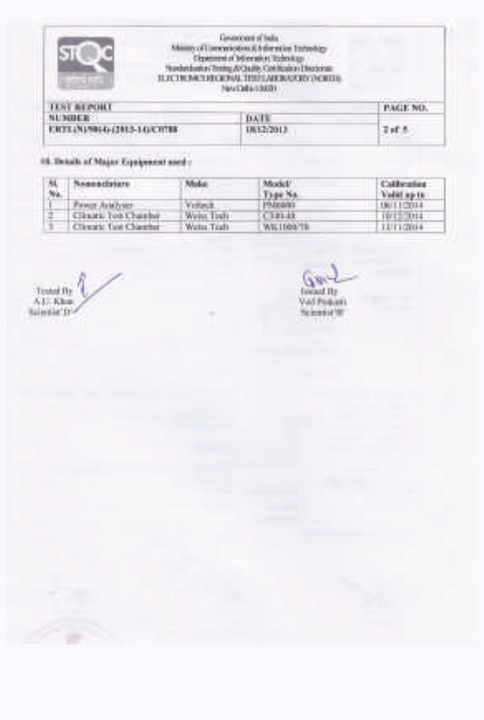
TEST REPORT NUMBER	DATE	DATE OF RECEIPT OF ITEM	DATE OF COMPLETION OF TESTING	PAGE NO.
ERTL(N)/90(4)-(2013-14)/C0788	18/12/2013	02/12/2013	17/12/2013	1 of 5

1. Service Request Form:	Number	135834
	Date	02/12/2013
2. Customer	Name	M/s Sukam Power Systems Ltd.
	Address	Plot No.34,Udyog Vihar, Ph-VI,Sector 37,Gurgaon, Haryana.
3.Manufacturer (As declared by customer)	Name	M/s Sukam Power Systems Ltd.
	Address	Plot No.34,Udyog Vihar, Ph-VI,Sector 37,Gurgaon, Haryana.
4.Description of Item	Nomenclature	Grid Tied Inverter 1.0kW
	Make /Trade Mark	Sukam
	Model No./Type No.	1.0K-SM
	Number of sample/ Serial No.	01No. 12061134022-0001
	Year of Manufacture	2011
	Condition	Good
5. Name & address where testing carried out (In-house/Subcontracting/Single window service/On-site/Using Customer Facilities)		ELECTRONICS REGIONAL TEST LABORATORY (NORTH) Okhla Industrial Area Phase-II, New Delhi-110020
6. Applicable standard/ specification		Customer's
7. Test Method/ Operating Procedure		IEC60068-2-1, IEC60068-2-2, IEC60068-2-14, IEC60068-2-30
8. Environmental Conditions	Temperature	25-27C
	Relative Humidity	45-75%
9. No. of Annexures (If any)		Nil

Tested By
A.U. Khan
Scientist'D'

Approved By
Ashok Kumar
Scientist'E'
(Authorized Signatory)

Issued By
Ved Prakash
Scientist'B'



Government of India
Ministry of Communication & Information Technology
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ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

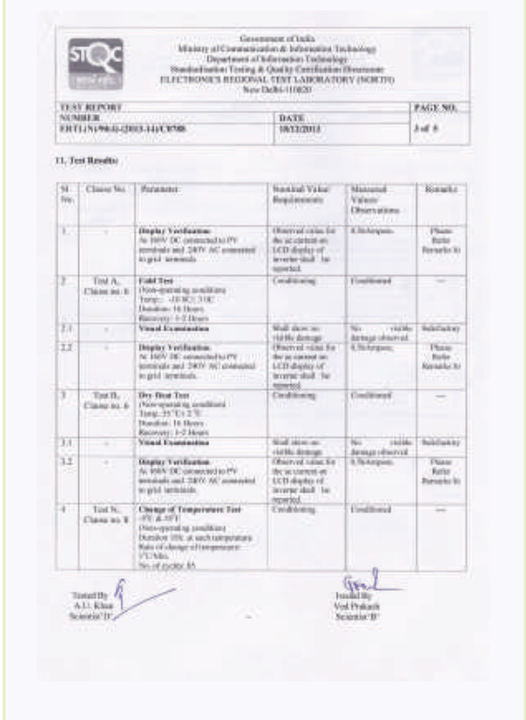
TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2013-14)/C0788	18/12/2013	2 of 5

10. Details of Major Equipment used :

Sl. No.	Nomenclature	Make	Model/ Type No.	Calibration Valid up to
1	Power Analyser	Voltech	PM6000	06/11/2014
2	Climatic Test Chamber	Weiss Tech	C340.40	10/12/2014
3	Climatic Test Chamber	Weiss Tech	WK1000/70	11/11/2014

Tested By
A.U. Khan
Scientist'D'

Issued By
Ved Prakash
Scientist'B'



Government of India
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New Delhi-110020

TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2013-14)/C0788	18/12/2013	3 of 5

11. Test Results:

Sl. No.	Clause No.	Parameter	Standard Value/ Requirements	Measured Values/ Observations	Remarks
1	-	**Display Verification:** At 360V DC connected to PV terminals and 240V AC connected to grid terminals	Observed value for the ac current on LCD display of inverter shall be reported.	8.5Amperes.	Please Refer Remarks 6)
2	Test A, Clause no. 8	**Cold Test** (Non-operating condition) Temp.: -10 (W.C) 3.0C Duration: 16 Hours Recovery: 1-2 Hours	Conditioning	Conditioned	---
2.1	-	**Visual Examination**	Shall show no visible damage	No visible damage observed.	Satisfactory
2.2	-	**Display Verification:** At 360V DC connected to PV terminals and 240V AC connected to grid terminals.	Observed value for the ac current on LCD display of inverter shall be reported.	8.5Amperes.	Please Refer Remarks 6)
3	Test B, Clause no. 8	**Dry Heat Test** (Non-operating condition) Temp.:55°C± 2°C Duration: 16 Hours Recovery: 1-2 Hours	Conditioning	Conditioned	---
3.1	-	**Visual Examination**	Shall show no visible damage	No visible damage observed.	Satisfactory
3.2	-	**Display Verification** At 360V DC connected to PV terminals and 240V AC connected to grid terminals.	Observed value for the ac current on LCD display of inverter shall be reported.	8.5Amperes.	Please Refer Remarks 6)
4	Test Nc, Clause no. 8	**Change of Temperature Test** -5°C & 55°C (Non-operating condition) Duration 03h at each temperature Rate of change of temperature: 1°C/Min. No. of cycle: 05	Conditioning	Conditioned	---

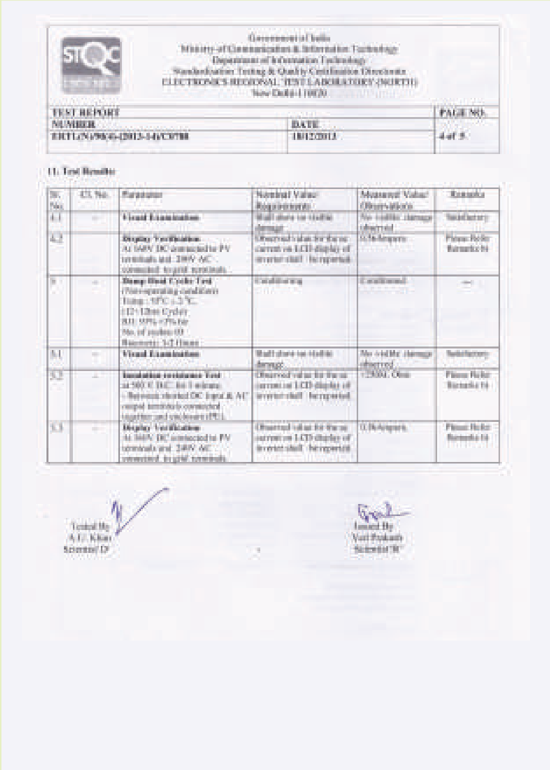
Tested By
A.U. Khan
Scientist'D'

Issued By
Ved Prakash
Scientist'B'

Grid Tie Inverter

Test Reports and Certificates

Government of India Test Reports



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New Delhi-110020

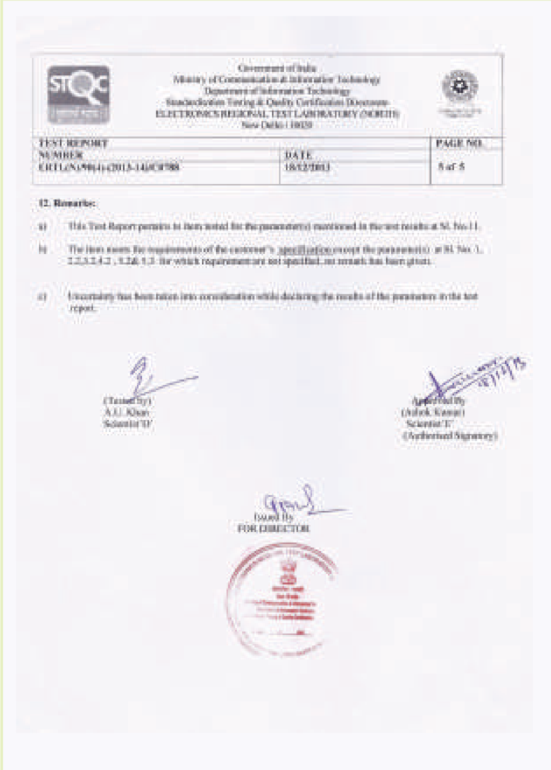
TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/98(4)-(2013-14)/C8788	18/12/2013	4 of 5

11. Test Results

Sl. No.	Cl. No.	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
4.1	–	**Visual Examination**	Shall show no visible damage	No visible damage observed	Satisfactory
4.2		**Display Verification** At 360V DC connected to PV terminals and 230V AC connected to grid terminals	Observed value for the ac current on LCD display of inverter shall be reported	0.56 Ampere	Please Refer Remarks (b)
5	–	**Damp Heat Cyclic Test** (Non-operating condition) Temp.: 55°C ±2°C (12+12hrs Cycle) RH: 95% +3% for No. of cycles: 01 Recovery: 1-2 Hours	Conditioning	Conditioned	—
5.1	–	**Visual Examination**	Shall show no visible damage	No visible damage observed	Satisfactory
5.2	–	**Insulation resistance Test** at 500 V DC for 1 minute - Between shorted DC input & AC output terminals connected together and enclosure (PE)	Observed value for the ac current on LCD display of inverter shall be reported	>200M Ohm	Please Refer Remarks (b)
5.3	–	**Display Verification** At 360V DC connected to PV terminals and 230V AC connected to grid terminals	Observed value for the ac current on LCD display of inverter shall be reported	0.56 Ampere	Please Refer Remarks (b)

Tested By
A.U. Khan
Scientist 'D'

Issued By
Ved Prakash
Scientist 'B'



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Ministry of Communication & Information Technology
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ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/98(4)-(2013-14)/C8788	18/12/2013	5 of 5

12. Remarks:

a) This Test Report pertains to item tested for the parameter(s) mentioned in the test results at Sl. No.11.

b) The item meets the requirements of the customer's specification except the parameter(s) at Sl. No. 1, 2.2, 3.2, 4.2, 5.2 & 5.3 for which requirements are not specified, no remark has been given.

c) Uncertainty has been taken into consideration while declaring the results of the parameters in the test report.

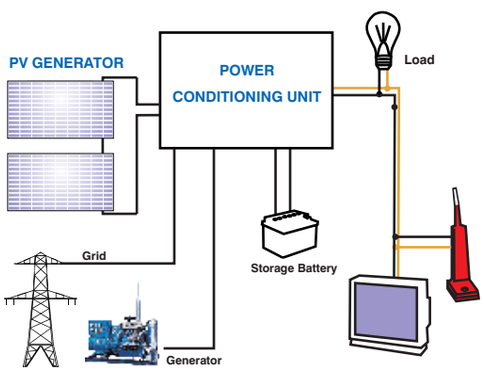
(Tested By)
A.U. Khan
Scientist 'D'

Approved By
(Ashok Kumar)
Scientist 'E'
(Authorised Signatory)

Issued By
FOR DIRECTOR

SOLAR POWER CONDITIONING UNIT

Solar Power Conditioning Unit (PCU) is an integrated system consisting of a solar charge controller, inverter and a Grid charger. It provides the facility to charge the battery bank either through Solar or Grid/DG Set. The PCU continuously monitors the state of Battery Voltage, Solar Power output and the loads. Due to sustained usage of power, when the Battery Voltage falls below a preset level, the PCU will automatically transfer the load to the Grid/DG power and also charge the Batteries through the in-built Grid Charger. Once the Batteries are charged to the preset level, the PCU cuts off the Grid / DG power from the system and will restore to feeding the loads from the battery bank & continue to charge the battery bank from the available Solar power.



The PCU always gives preference to the Solar Power and will use Grid/DG power only when the Solar power/ Battery charge is insufficient to meet the load requirement.

It's a Power Conditioning Unit (PCU) with special feature like pure sine wave output and more for using in remote areas, where utility line is weak and renewable Energy (RE) sources are available. The PCU is designed to convert energy from RE source as the first priority and to stream energy from grid line when energy from the RE source is lower than the set level.

Sine Wave Output

Waveform is an important consideration when choosing a power source. Su-kam's Power Conditioning Unit (PCU) features pure sine wave output. It means clean, regulated power that is identical to or even better than the power supplied by the local utility power source and "modified sine wave" or "square wave" products, which all provide a fluctuating output voltage that is suitable for powering only a limited selection of loads and may be harmful for your electrical appliances.

SOLAR POWER CONDITIONING UNIT

PWM

Single Phase
850VA/12V
600VA/24V, 1KVA/24V,
2KVA/48V, 3KVA/48V,
3KVA/96V, 4KVA/96V, 5KVA/96V, 6KVA/96V,
7.5KVA/120V, 10KVA/180V

MPPT

Single Phase
100VA/24V, 500VA/24V, 600 VA/24V, 1000VA/24V
2KVA/48V, 3KVA/48V,
3KVA/96V, 4KVA/96V, 5KVA/96V,
8KVA/120V, 10KVA/120V
Three Phase
15KVA - 30KVA/240V,
50KVA/360V, 100KVA/360V

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: UPS-BR-SW-012AA-00850

Range - Capacity 850VA/12V with 15A Solar Charge Controller

Brainy is a modern artificial intelligent machine with contemporary look - a first in the power back- up industry which has been introduced by Su-Kam. Brainy is the world's first hybrid Home UPS to harness solar energy into electricity and use its artificial intelligence to maximize utilization of solar energy to power homes. Brainy can operate on both Solar Power as well as Grid Power. It is integrated with in-built Solar Charge Controller which enables the conversion of solar power to electricity.

Working Principle

The UPS always gives preference to solar power while charging the battery. It senses the availability of solar power, grid power and gives charging preference to the solar power charge and only switches to the grid when the solar power is not available. It is designed to give you maximum benefit from the sun and minimize your electricity bill. In fact, the battery charging from the sun is highly efficient – more than >96%.

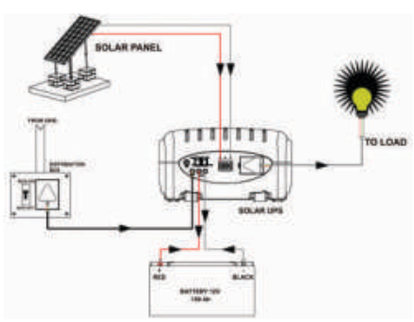
Features

- Brainy Solar Hybrid UPS can operate on both Solar Power as well as Grid Power
- Integrated with an in-built 15amp Solar Charge Controller that enables the conversion of solar power to electricity
- Brainy Solar Hybrid UPS always gives preference to solar power while charging the battery
- It is designed to give you maximum benefit from the sun and minimize your electricity bill
- Brainy UPS is used with 80W panel which is expandable to 240W in 12V
- Multi-information LCD display panel showing Rs saved from Solar, Battery voltage etc
- Contemporary, futuristic design
- Affordable pricing to suit any budget
- Easy system installation

Convenience

- Brainy uses both solar power and grid power and shares them to give you an uninterrupted Power supply to your home
- The futuristic and aesthetic design of Brainy adds to the overall ambience of the room
- Affordable pricing to suit everyone's budget
- Easy system installation

INSTALLATION DIAGRAM



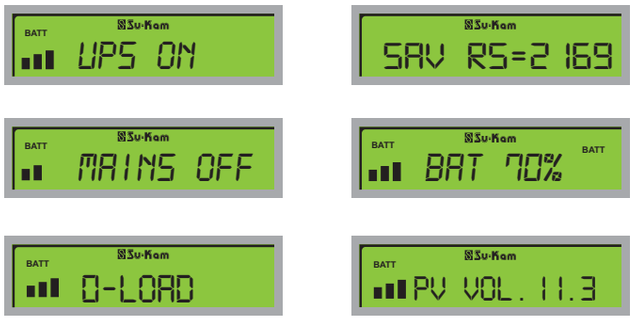
LOAD CHART

	A	B	C	D	E
Computer	1	-	-	-	-
TV	-	-	1	-	-
Tube light	3	2	3	4	-
FAN	3	2	3	4	-
Room Cooler	-	-	-	1	-
CFL	-	-	-	2	36

Indicative values only, actual calculation depends on manufacturer's specification

Displays

- User friendly display. Informative LCD displays for use and to understand the functionalities of the system.
- An easy to read LCD panel ensures display of information of every event running like battery charging, system on/off, battery charge level, output load percentage and various other system status.



- Critical visual blinking warnings like over load, low battery, main fuse blown, short circuit, high temperature etc. Saves valuable time in identifying and rectifying fault areas and increases system life.
- LCD panel shows rupees saved from Solar charging at pre determined tariff rate.

Eco Friendly

- Brainy draws power from solar energy as first preference.
- Unlike conventional energy fuel, Solar PV Panel doesn't emit any gases or leaves any residuals, thus reducing global warming and contributing towards a greener environment.
- Due to extended battery life, the periodic process of battery replacement and disposing

Certificates

- IEC 61683, IEC 60068-2-1,2,14,30,31
- IEC 62093
- MNRE Approved
- EN - 62040 - 1, EN - 62040 - 2
- LE Certified

Matching Trolley

- X-tra durable: Made from tough, long lasting PPCP compound material which does not get destroyed ever if there is leakage / spillage from batteries.
- X-tra convenient: In built ribs for smooth in and out movement of battery without getting stuck.
- X-tra ease of movement: Sturdy yet smooth wheels enabling extra ease of movement while carrying the bulky battery.
- X-tra space saving: Stacks up with Inverter / UPS neatly in a corner, thus taking less space. Aesthetically designed to match
- X-tra safe: Provides good ventilation for battery.

TECHNICAL SPECIFICATIONS

Backup Mode (Solar Power Available / Not Available)	
Inverter Output power	850VA/12VDC
Wave form type	Sine wave
Output Voltage in Volts (AC)	220 V ± 10 %
Output frequency in Hz	50 ± 1% Hz
Efficiency	> 75% (80-100% Resistive Load)
Distortion (THD)	
Forced ventilation	
Nominal Input voltage (DC)	
Battery Low Voltage warning	10.7V±0.2V
Battery Low Voltage cut off	10.5V±0.2V
Battery Reverse pole protection	Dc Fuse Blown
Short Circuit protection	retry for 4 times & permanent out put OFF
Over load Protection	150% for >10 Seconds
Over Load Shutdown	permanent out put OFF
Over Heating protection	>105°C
Grid Mains Mode	
Grid Charging Current	
(Tubular / SMF / LA)	14A ± 2A*
Charge End Voltage (Battery Boost & Float Charging Voltage)	14.4V (SMF, Tubular) / 14.0V (LA) +/-0.2V.(Grid charging stops when battery reaches float charging 13.6V+/-0.2V and PV power will be >5 to 8W then System transfer to backup mode as same as specified changeover time (Ups <15 msec. or W-Ups <40msec. **).
Change over time:	Mains to Inverter < 40 milliseconds
Wide Window & Narrow Window	Mains to Inverter <15 milliseconds
Wide Window	
Grid low cut	105VAC ±10V
Grid low cut recovery	120VAC ±10V
Grid high cut	285VAC ±10V
Grid high cut recovery	275VAC ±10V
Narrow Window	
Grid low cut	185VAC ±10V
Grid low cut recovery	190VAC ±10V
Grid high cut	265VAC ±10V
Grid high cut recovery	255VAC ±10V

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-024AA-00600

PWM Range - Single Phase: 600 VA/24V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

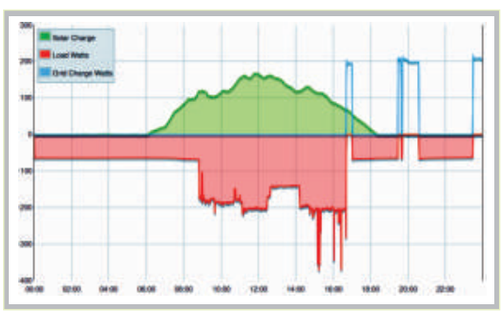
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

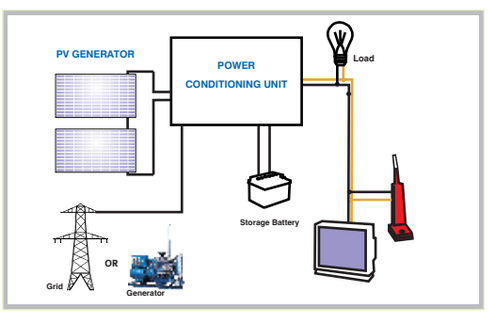
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	600VA
PV Charge Controller Rating	600Wp
Model No.	PCU 6H24
Power device	MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	24V
Input Voltage Range	22V-30V±0.4V
Low Battery cut off	22.6V ± 0.4V
High Battery shutdown	NA
No load shutdown enable	
Output Waveform	Pure Sine Wave
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
Grid power usage	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temperature
GRID CHARGER	
Grid I/P Voltage Range	WW-175-285
	NW-190-265±10V
Charging Current	13A±1A
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	> 20A
Bulk Voltage	28.8V±0.4V
Adjustable Bulk Voltage	53V-60V
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	27V±0.4V
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
Automatic Charger Restart Time	3.5 Minutes
after High Current	
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency,
	Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Relative Humidity	0-95% Non-Condensing
Dimension	245x450x356 mm
Weight	17.6 kg

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-024AA-01000

PWM Range - Single Phase: 1KVA/24V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

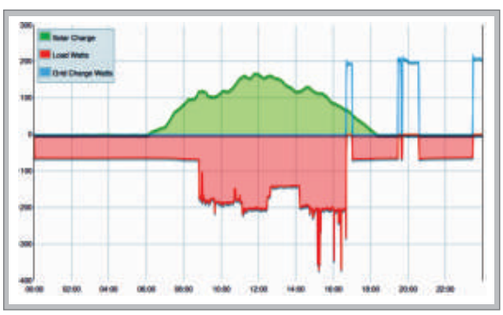
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

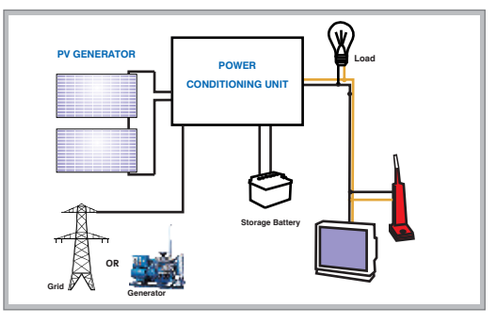
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



Solar Power Conditioning Unit

Single Phase PWM Range

TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	1KVA
PV Charge Controller Rating	1KWp
Model No.	PCU 1K24
Power device	MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	24V
Input Voltage Range	22V-30V±0.4V
Low Battery cut off	22.6V ± 0.4V
High Battery shutdown	NA
No load shutdown enable	
Output Waveform	Pure Sine Wave
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
Grid power usage	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temperature
GRID CHARGER	
Grid I/P Voltage Range	WW-175-285
	NW-190-265±10V
Charging Current	13A±1A
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	> 20A
Bulk Voltage	28.8V±0.4V
Adjustable Bulk Voltage	53V-60V
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	27V±0.4V
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temperature
Automatic Charger Restart Time	3.5 Minutes
after High Current	
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency,
	Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Relative Humidity	0-95% Non-Condensing
Dimension	245x450x356 mm
Weight	23.6 kg

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-048AA-02000

PWM Range - Single Phase: 2KVA/48V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

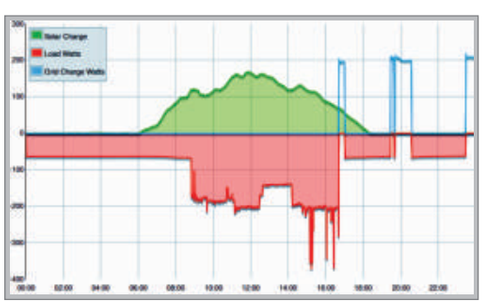
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

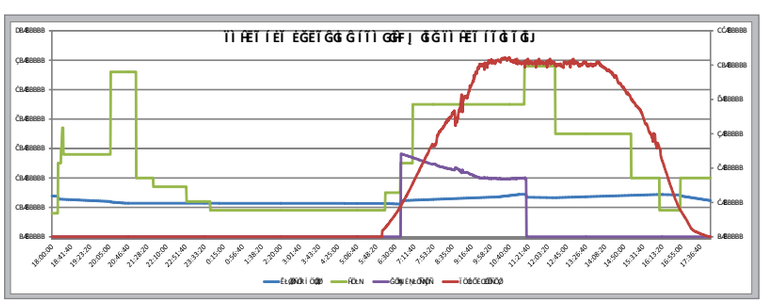
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU CHARGING PROFILE WITH SOLAR PRIORITY



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	2KVA
PV Charge Controller Rating	2kWp
Model No.	PCU2K48
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	48V
Input Voltage Range DC	44V-60V ±2%
Low Battery cut off	44V ±2%
High Battery shutdown	65V ±2%
No load shutdown ON/OFF (Factory	Permanent OFF after 5minutes if load is ⩽ 40W
settable as per customer requirement)	
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85% (linear load)
Output Waveform	Pure Sine Wave
Total Load	2kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<3% (linear load)
Power usage Priority	From Photovoltaic Array
Crest Factor	3:1
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	> 30A
Bulk Voltage	57.6V ±2%
Adjustable Bulk Voltage	53V-60V
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	54V ±2%
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
OTHER SPECIFICATIONS	
LCD massage	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Relative Humidity	0-95% Non-Condensing
Weight	35 kg
Dimensions (w x d x h)	351x617x320 mm

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-048AA-03000

PWM Range - Single Phase: 3K VA/48V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

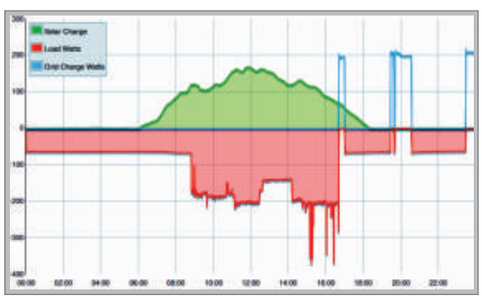
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

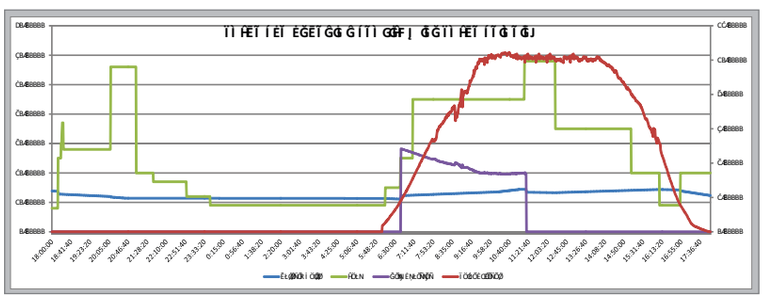
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU CHARGING PROFILE WITH SOLAR PRIORITY



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	3KVA
PV Charge Controller Rating	3kWp
Model No.	PCU2K48
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	48V
Input Voltage Range DC	44V-60V ±2%
Low Battery cut off	44V ±2%
High Battery shutdown	65V ±2%
No load shutdown ON/OFF (Factory	Permanent OFF after 5minutes if load is ⩽ 40W
settable as per customer requirement)	
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85% (linear load)
Output Waveform	Pure Sine Wave
Total Load	2kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<3% (linear load)
Power usage Priority	From Photovoltaic Array
Crest Factor	3:1
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	> 30A
Bulk Voltage	57.6V ±2%
Adjustable Bulk Voltage	53V-60V
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	54V ±2%
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
OTHER SPECIFICATIONS	
LCD massage	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Relative Humidity	0-95% Non-Condensing
Weight	61 kg
Dimensions (w x d x h)	351x617x320 mm

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-096AA-03000

PWM Range - Single Phase: 3KVA/96V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

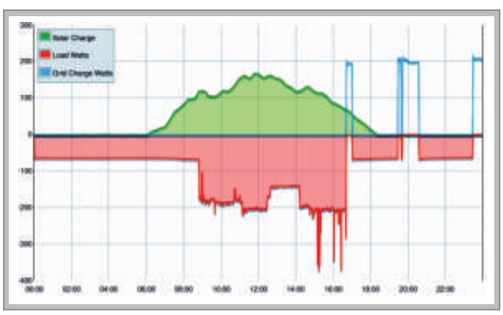
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

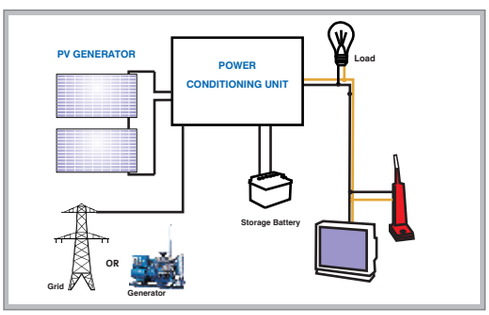
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	3KVA
PV Charge Controller Rating	3kWp
Model No.	3K96
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	96V
Input Voltage Range	88V-120V ±2%
Low Battery cut off	88V±2%
High Battery shutdown	130V ±2%
No load Power Consumption with	Less than 15W
No load shutdown enable	
No load shutdown ON/OFF (Factory settable as per customer requirement)	If the load is <60W, Output 5sec ON and 50sec OFF every cycle.
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85%
Output Waveform	Pure Sine Wave
Total Load	3kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V NW-190-265±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	>30A
Bulk Voltage	57.6V ±2%
Adjustable Bulk Voltage	106-120V
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	108V ±2%
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
Automatic Charger Restart Time	3.5 Minutes
after High Current	
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Weight	61 kg
Dimensions (w x d x h)	350x585x665 mm

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-096AA-04000

PWM Range - Single Phase: 4KVA/96V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

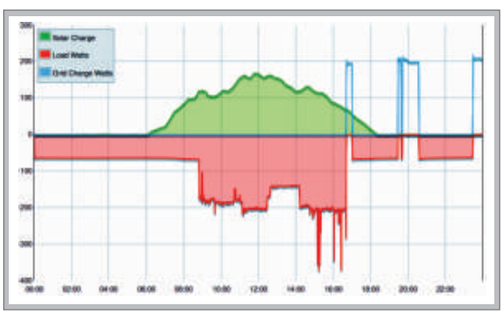
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

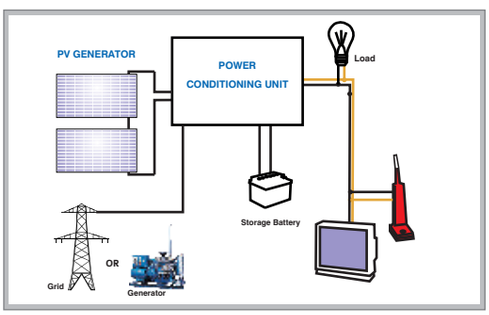
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	4KVA
PV Charge Controller Rating	4kWp
Model No.	PCU4K96
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	96V
Input Voltage Range	225V±2%
Low Battery cut off	88V±2%
High Battery shutdown	
No load Power Consumption with	Less than 20W
No load shutdown enable	
No load shutdown ON/OFF (Factory	Permanent OFF after 5minutes if load is ⩽ 40W
settable as per customer requirement)	
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85%
Output Waveform	Pure Sine Wave
Total Load	4kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V NW-190-265±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	>45A
Bulk Voltage	115.2V ±2%
Adjustable Bulk Voltage	
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
Automatic Charger Restart Time after High Current	3.5 Minutes
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Weight	68.7 kg
Dimensions (w x d x h)	350x585x665 mm

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-096AB-05000

PWM Range - Single Phase: 5KVA/96V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

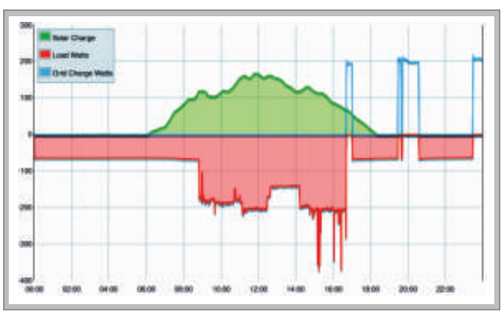
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

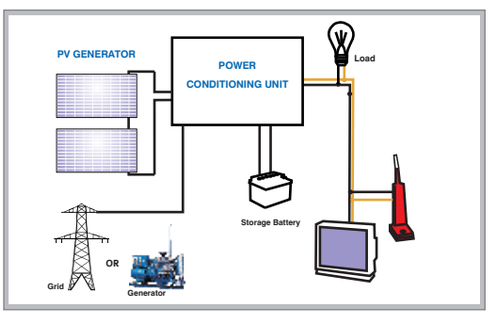
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	5KVA
PV Charge Controller Rating	5kWp
Model No.	PCU5K96
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	96V
Input Voltage Range	88V-120V ±2%
Low Battery cut off	110V±2%
High Battery shutdown	162±2%
No load Power Consumption with	Less than 20W
No load shutdown enable	
No load shutdown ON/OFF (Factory settable as per customer requirement)	Permanent OFF after 5minutes if load is ⩽ 40W
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85%
Output Waveform	Pure Sine Wave
Total Load	5kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V NW-190-265±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	>45A
Bulk Voltage	115.2V ±2%
Adjustable Bulk Voltage	132.5V-150V
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	135±2%
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
Automatic Charger Restart Time after High Current	3.5 Minutes
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Weight	72 kg
Dimensions (w x d x h)	350x585x665 mm

Solar Power Conditioning Unit

Single Phase PWM Range

Product Code: PCU-SP-OT-096AA-06000

PWM Range - Single Phase: 6KVA/96V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

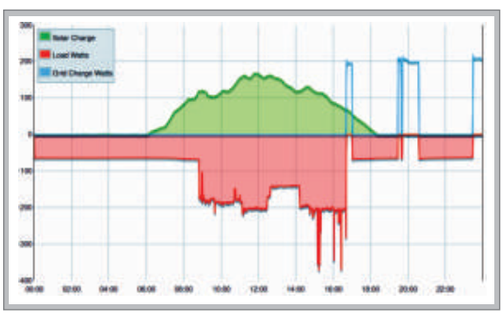
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

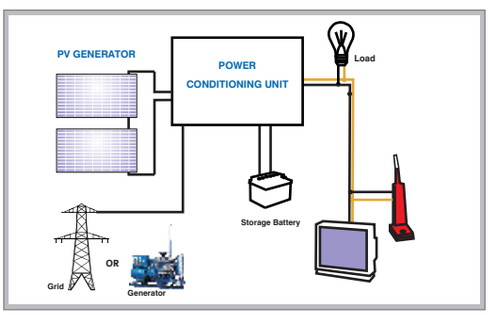
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	6KVA
PV Charge Controller Rating	6kWp
Model No.	PCU6K96
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	96V
Input Voltage Range	88V-120V ±2%
Low Battery cut off	110V±2%
High Battery shutdown	162±2%
No load Power Consumption with	Less than 20W
No load shutdown enable	
No load shutdown ON/OFF (Factory settable as per customer requirement)	Permanent OFF after 5minutes if load is ⩽ 40W
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85%
Output Waveform	Pure Sine Wave
Total Load	6kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
Grid power usage	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V NW-190-265±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	>60A
Bulk Voltage	
Adjustable Bulk Voltage	199V-225V
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Float Voltage	202±2%
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
Automatic Charger Restart Time after High Current	3.5 Minutes
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB
Weight	86 kg
Dimensions (w x d x h)	350x585x665 mm

Solar Power Conditioning Unit

Single Phase PWM Range

PWM Range - Single Phase: 7.5KVA/120V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It has inbuilt intelligence to utilize the solar power on priority.

Working Principle

Solar PCU converts energy from solar panel as the first priority and incase the solar power can not support the load grid power is used to charge the battery and supply load.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

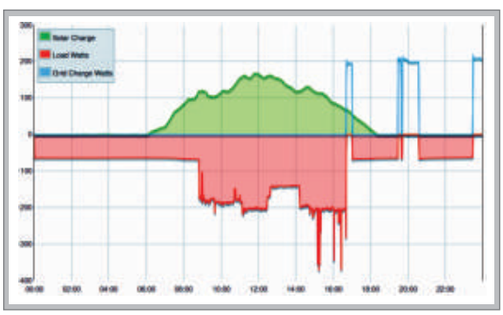
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

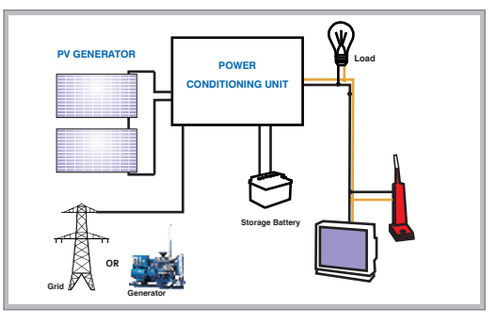
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	7.5KVA
PV Charge Controller Rating	7.5kWp
Model No.	PCU7.5K120
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	120V
Input Voltage Range	110V-150V±2%
No load Power Consumption with	Less than 30W
No load shutdown enable	
No load shutdown ON/OFF (Factory	Permanent OFF after 5minutes if load is ⩽ 40W
settable as per customer requirement)	
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85%
Output Waveform	Pure Sine Wave
Total Load	7.5kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
Grid power usage	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V NW-190-265±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	>40A
Bulk Voltage	145±2%
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
Automatic Charger Restart Time	3.5 Minutes
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB

Solar Power Conditioning Unit

Single Phase PWM Range

PWM Range - Single Phase: 10KVA/180V

It is an integrated system consisting of a Solar Charge Controller, Inverter and a Grid charger. It is responsible for monitoring the state of battery voltage, solar power output and the load while charging the battery bank through a solar/grid or DG set.

Working Principle

Solar PCU converts energy from RE source as the first priority and it stream energy from grid line when energy from the RE source is lower than the set level.

Features

- Pure sine wave output
- In-built heavy duty Solar charge Controller
- Excellent overload capabilities
- Optimal battery protection
- Best reliability
- High reliability with Minimal maintenance
- Grid charging enable disable option
- Solar and Grid charging current sharing for maximum solar usage
- User set-able Solar Mains Battery (SMB) and Solar Battery Mains (SBM) operations

Electronic Protection updates

- Battery low protection
- Battery over voltage shutdown
- Over temperature and overload protection
- Short circuit protection
- Reverse polarity protection by internal fuse
- Acoustic alarm in various warning conditions

Displays

- Display showing PV & Inverter output
- LCD showing various input and output parameters such as •Output voltage •load •input voltage •battery voltage •PV voltage •current with cumulative solar energy.

Operation

- Short circuit , over load & over heating protection
- Automatic Charger Restart Time after High Current

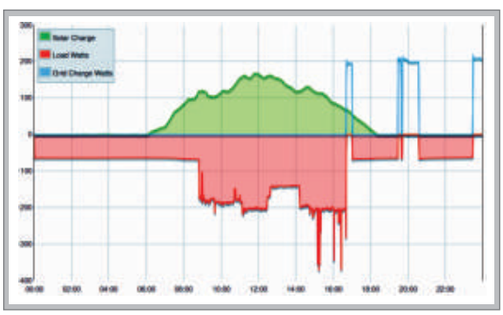
Remote Monitoring Software

- Remote monitoring through RS232, Ethernet, GSM, GPRS

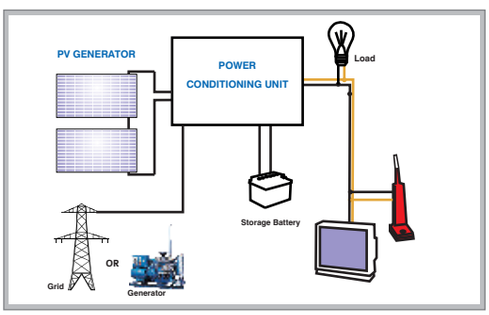
Certification & patents

- IEC61683, IEC60068-2-1,2,14,30,31 (N/A for 6H24); IEC62093 certification

GENERATION PROFILE



SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Type	Single Phase Solar Power Conditioning Unit
Technology	DSP Based PWM Technology
Ratings	10KVA
PV Charge Controller Rating	10kWp
Model No.	PCU10K180
Power device	IGBTs cum MOSFETs
INVERTER	
INPUT PARAMETERS	
Nominal I/P Voltage	180V
Input Voltage Range	110V-150V±2%
No load Power Consumption with	Less than 30W
No load shutdown enable	
No load shutdown ON/OFF (Factory	Permanent OFF after 5minutes if load is ⩽ 40W
settable as per customer requirement)	
OUTPUT PARAMETERS	
Voltage Regulation at nominal voltage	230 ± 5%
Frequency Regulation	50Hz ± 0.2Hz
Efficiency (typical)at linear load	>85%
Output Waveform	Pure Sine Wave
Total Load	10kW@UPF
Overload	200% for 8seconds
THD (on Linear Load)	<5%
Power usage Priority	From Photovoltaic Array
Crest Factor	>3:1
Grid power usage	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
GRID CHARGER	
Grid I/P Voltage Range	WW-155 VAC-280VAC±10V and NW-185 VAC-265VAC±10V NW-190-265±10V
Charging Current	Max. 30Amp + 2Amp (Factory settable)
SOLAR CHARGE CONTROLLER	
Type	Series Regulator Common Negative
Maximum I/P PV Voltage	25V Per 12V Solar Panel
Solar Array	Single Array
Charging Current Imax.	>40A
Bulk Voltage	216±2%
Transition from float to bulk	Below float level for a cumulative period of 1 hour
Protection	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
Automatic Charger Restart Time	3.5 Minutes
Cooling	Forced air
OTHER SPECIFICATIONS	
Indications	Indications for PV voltage, Battery Voltage, Output Voltage, Output Frequency, Output Current, Charging Current, Charging Mode, High Temp., High Current, Array Reverse Polarity etc.
Operating Temp.	0°C to + 45°C
Storage Temp.	0°C to + 55°C
Acoustic Noise	< 60dB

Solar Power Conditioning Unit

Single Phase MPPT Range

Product Code: PCU-SP-OT-024AA-00100

MPPT Range - Single Phase: 100VA/24V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

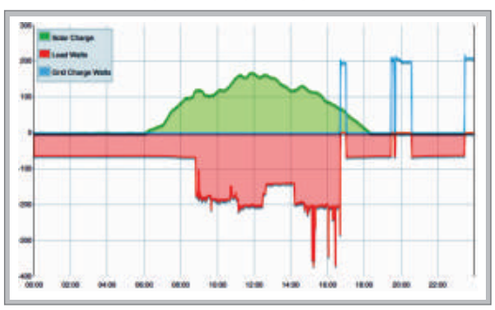
Optional

- Availability of O/P I/P

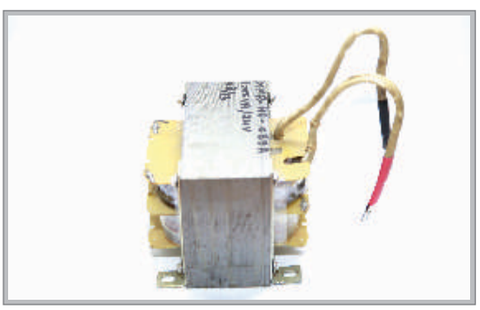
Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

GENERATION PROFILE



TRANSFORMER



TECHNICAL SPECIFICATIONS

Type	MPPT BASED SOALR POWER CONDITIONING UNIT	
Technology	DSP Based MPPT Technology	
Solar PCU Rating	100VA	
PV Charge Controller Rating	100Wp	
Model No.	PCU1H24	
INPUT PARAMETERS		
Nominal I/P DC Voltage	24V	
Input DC Voltage Range	23.2-28.8V±0.2V	
Low Battery cut off	23.2V±0.2V	
Inverter Restart time after low battery when mains is not available	Battery voltage should be ⩾ 27V	
High Battery shutdown	31V±2V	
No load Power Consumption with No load shutdown enable	Less than 10W	
No load shutdown ON/OFF (Factory settable as per customer requirement)	N/A	
OUTPUT PARAMETERS		
Waveform & Regulation	Pure Sine Wave 220V±2%	
Efficiency (typical)at linear load	⩾88%	
Total Load	100W @ UPF	
Grid power usage	Automatic only after low battery cut-off and after attaining float charge stage mains power usage will discontinue and charging from mains will happen during 10 am to 6 pm only when PV power is insufficient.	Automatic, if batteries voltage ⩽ 24 V in S-G-B mode and ⩽ 22 V in S-B-G mode. After attaining float charge stage mains power usage will discontinue when PV power ⩾ 50W
Transfer Time inverter to mains & vice-versa	Typical>20msec.	
GRID CHARGER		
Grid I/P Voltage Range	150VAC-260VAC	
Charging Current	4.0A±0.5A	
SOLAR CHARGE CONTROLLER		
Type	MPPT	
Charging Current Imax. Peak	5.0A	
Bulk Voltage	28.4V +Temp. Compensation	
Adjustable Bulk Voltage	(Adjustable 27.6V-28.8V) factory setting 28.8V	
Float Voltage	27.4V+Temp. Compensation	
Dimension	245x430x155 mm	
Weight	9.13 kg	

Note: Specifications are subject to change without any prior notice.
*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

MPPT Range - Single Phase: 300VA/24V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

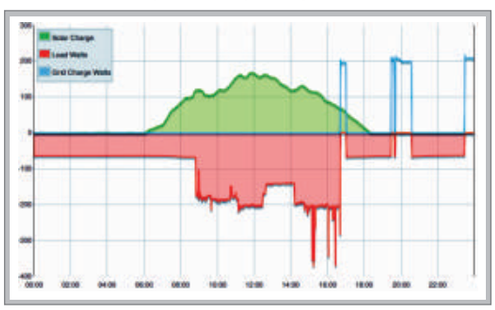
Optional

- Availability of O/P I/P

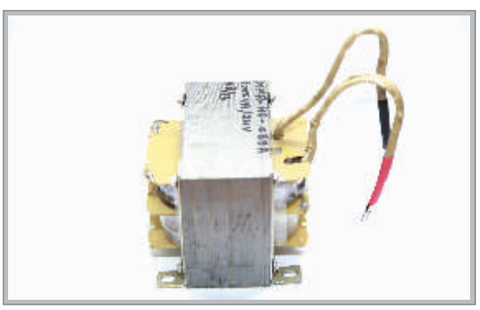
Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

GENERATION PROFILE



TRANSFORMER



TECHNICAL SPECIFICATIONS

Type	MPPT BASED SOALR POWER CONDITIONING UNIT	
Technology	DSP Based MPPT Technology	
Solar PCU Rating	300VA	
PV Charge Controller Rating	300Wp	
Model No.	PCU1H24	
INPUT PARAMETERS		
Nominal I/P DC Voltage	24V	
Input DC Voltage Range	23.2-28.8V±0.2V	
Low Battery cut off	23.2V±0.2V	
Inverter Restart time after low battery when mains is not available	Battery voltage should be ⩾ 27V	
High Battery shutdown	31V±2V	
No load Power Consumption with No load shutdown enable	Less than 10W	
No load shutdown ON/OFF (Factory settable as per customer requirement)	N/A	
OUTPUT PARAMETERS		
Waveform & Regulation	Pure Sine Wave 220V±2%	
Efficiency (typical)at linear load	⩾88%	
Total Load	100W @ UPF	
Grid power usage	Automatic only after low battery cut-off and after attaining float charge stage mains power usage will discontinue and charging from mains will happen during 10 am to 6 pm only when PV power is insufficient.	Automatic, if batteries voltage ⩽ 24 V in S-G-B mode and ⩽ 22 V in S-B-G mode. After attaining float charge stage mains power usage will discontinue when PV power ⩾ 50W
Transfer Time inverter to mains & vice-versa	Typical>20msec.	
GRID CHARGER		
Grid I/P Voltage Range	150VAC-260VAC	
Charging Current	4.0A±0.5A	
SOLAR CHARGE CONTROLLER		
Type	MPPT	
Charging Current Imax. Peak	5.0A	
Bulk Voltage	28.4V +Temp. Compensation	
Adjustable Bulk Voltage	(Adjustable 27.6V-28.8V) factory setting 28.8V	
Float Voltage	27.4V+Temp. Compensation	
Dimension	247x423x269 mm	
Weight	17.5 kg	

Note: Specifications are subject to change without any prior notice.
*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

MPPT Range - Single Phase: 500VA/24V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

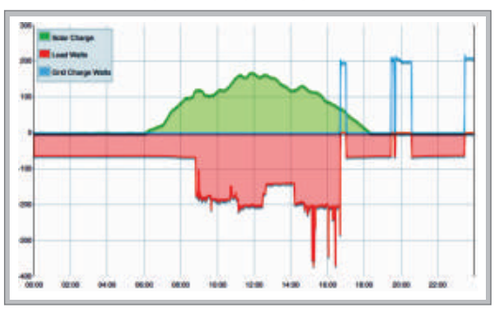
Optional

- Availability of O/P I/P

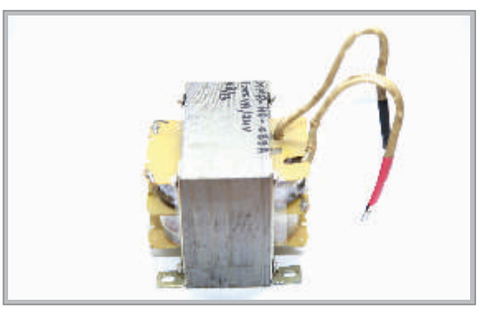
Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

GENERATION PROFILE



TRANSFORMER



TECHNICAL SPECIFICATIONS

Type	MPPT BASED SOALR POWER CONDITIONING UNIT	
Technology	DSP Based MPPT Technology	
Solar PCU Rating	500VA	
PV Charge Controller Rating	500Wp	
Model No.	PCU1H24	
INPUT PARAMETERS		
Nominal I/P DC Voltage	24V	
Input DC Voltage Range	23.2-28.8V±0.2V	
Low Battery cut off	23.2V±0.2V	
Inverter Restart time after low battery when mains is not available	Battery voltage should be ⩾ 27V	
High Battery shutdown	31V±2V	
No load Power Consumption with No load shutdown enable	Less than 10W	
No load shutdown ON/OFF (Factory settable as per customer requirement)	N/A	
OUTPUT PARAMETERS		
Waveform & Regulation	Pure Sine Wave 220V±2%	
Efficiency (typical)at linear load	⩾88%	
Total Load	500W @ UPF	
Grid power usage	Automatic only after low battery cut-off and after attaining float charge stage mains power usage will discontinue and charging from mains will happen during 10 am to 6 pm only when PV power is insufficient.	Automatic, if batteries voltage ⩽ 24 V in S-G-B mode and ⩽ 22 V in S-B-G mode. After attaining float charge stage mains power usage will discontinue when PV power ⩾ 50W
Transfer Time inverter to mains & vice-versa	Typical>20msec.	
GRID CHARGER		
Grid I/P Voltage Range	150VAC-260VAC	
Charging Current	13.0A±1A	
SOLAR CHARGE CONTROLLER		
Type	MPPT	
Charging Current Imax. Peak	24.0A	
Bulk Voltage	28.4V +Temp. Compensation	
Adjustable Bulk Voltage	(Adjustable 27.6V-28.8V) factory setting 28.8V	
Float Voltage	27.4V+Temp. Compensation	
Dimension	247x423x269 mm	
Weight	17.5 kg	

Note: Specifications are subject to change without any prior notice.
*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

Product Code: PCU-SP-OT-024AA-00600-02

MPPT Range - Single Phase: 600VA/24V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

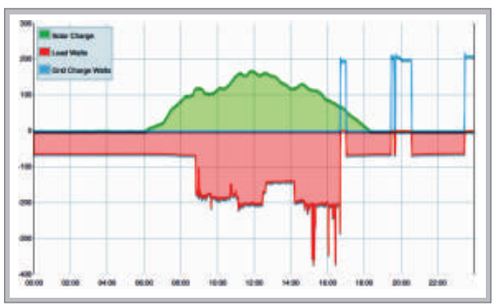
Optional

- Availability of O/P I/P

Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

GENERATION PROFILE



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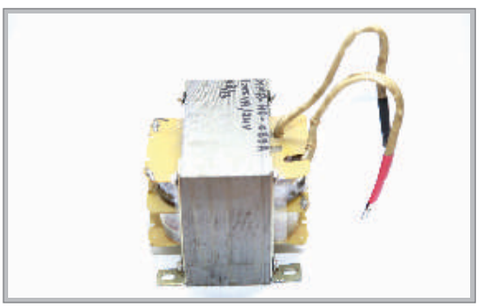


TECHNICAL SPECIFICATIONS

Type	MPPT BASED SOALR POWER CONDITIONING UNIT	
Technology	DSP Based MPPT Technology	
Solar PCU Rating	600VA	
PV Charge Controller Rating	600Wp	
Model No.	PCU600H24	
INPUT PARAMETERS		
Nominal I/P DC Voltage	24V	
Input DC Voltage Range	23.7-28.8V±0.2V	
Low Battery cut off	23.7v±0.2V	
Inverter Restart time after low battery when mains is not available	Battery voltage should be ⩾ 27V	
High Battery shutdown	31V±2V	
No load Power Consumption with No load shutdown enable	Less than 10W	
No load shutdown ON/OFF (Factory settable as per customer requirement)	N/A	
OUTPUT PARAMETERS		
Waveform & Regulation	Pure Sine Wave 220V±2%	
Efficiency (typical)at linear load	⩾85%	
Total Load	600W @ UPF	
Grid power usage	Automatic only after low battery cut-off and after attaining float charge stage mains power usage will discontinue and charging from mains will happen during 10 am to 6 pm only when PV power is insufficient.	Automatic, if batteries voltage ⩽ 24 V in S-G-B mode and ⩽ 22 V in S-B-G mode. After attaining float charge stage mains power usage will discontinue when PV power ⩾ 50W
Transfer Time inverter to mains & vice-versa	Typical>20msec.	
GRID CHARGER		
Grid I/P Voltage Range	160VAC-250VAC±10V	
Charging Current	20.0A±1A	
SOLAR CHARGE CONTROLLER		
Type	MPPT	
Charging Current Imax. Peak	20.0A	
Bulk Voltage	28.4V +Temp. Compensation	
Adjustable Bulk Voltage	(Adjustable 27.6V-28.8V) factory setting 28.8V	
Float Voltage	27.4V+Temp. Compensation	

Note: Specifications are subject to change without any prior notice.
*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

Product Code: PCU-SP-OT-024AA-01000-06

MPPT Range - Single Phase: 1000VA/24V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

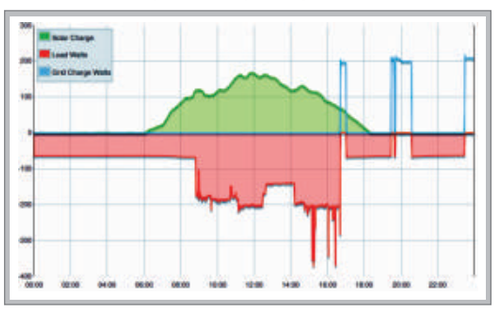
Optional

- Availability of O/P I/P

Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

GENERATION PROFILE



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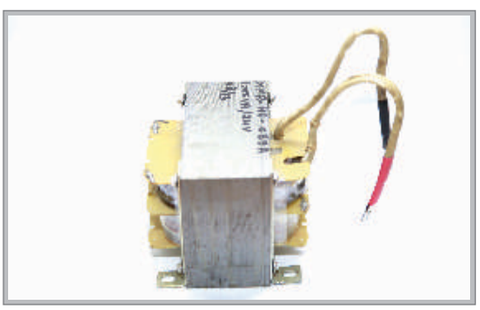


TECHNICAL SPECIFICATIONS

Type	MPPT BASED SOALR POWER CONDITIONING UNIT	
Technology	DSP Based MPPT Technology	
Solar PCU Rating	1000VA	
PV Charge Controller Rating	1000Wp	
Model No.	1K24	
INPUT PARAMETERS		
Nominal I/P DC Voltage	24V	
Input DC Voltage Range	22.0-28.8V ± 0.4 V	
Low Battery cut off	22.0V±0.4	
Inverter Restart time after low battery when mains is not available	Battery voltage should be ⩾ 27V	
High Battery shutdown	31V±2V	
No load Power Consumption with No load shutdown enable	Less than 10W	
No load shutdown ON/OFF (Factory settable as per customer requirement)	N/A	
OUTPUT PARAMETERS		
Waveform & Regulation	Pure Sine Wave 220V±2%	
Efficiency (typical)at linear load	⩾85%	
Total Load	1KW@UPF	
Grid power usage	Automatic only after low battery cut-off and after attaining float charge stage mains power usage will discontinue and charging from mains will happen during 10 am to 6 pm only when PV power is insufficient.	Automatic, if batteries voltage ⩽ 24 V in S-G-B mode and ⩽ 22 V in S-B-G mode. After attaining float charge stage mains power usage will discontinue when PV power ⩾ 50W
Transfer Time inverter to mains & vice-versa	Typical>20msec.	
GRID CHARGER		
Grid I/P Voltage Range	150 VAC to 275 VAC ±10V	
Charging Current	15Amp + 1Amp	
SOLAR CHARGE CONTROLLER		
Type	MPPT	
Charging Current Imax. Peak	1kWp PV Module 30A input current, Vmp approx. 34V in ideal Test Conditions.	
Bulk Voltage	28.8+ Temperature Compensation	
Adjustable Bulk Voltage	(Adjustable 27.6V-28.8V) factory setting 28.8V	
Float Voltage	27.4V+Temp. Compensation	

Note: Specifications are subject to change without any prior notice.
*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

MPPT Range - Single Phase: 2KVA/48V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

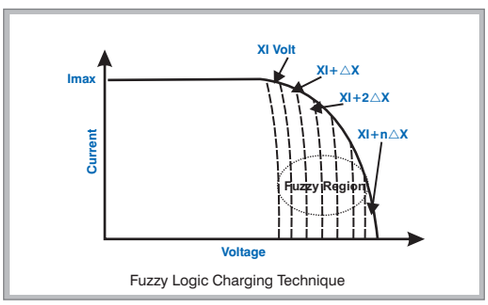
Optional

- Availability of O/P I/P

Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

BATTERY CARE CURVE



Fuzzy Logic Charging Technique

TECHNICAL SPECIFICATIONS

Rating	2KVA
DC voltage	48V
Solar Voltage Range	
MPPT Range	55V-96V
Charge Controller	MPPT based Charge Controller (MPPT rating can be customized as per requirement)
MPPT Rating	75A
Battery DC Voltage	48VDC
Battery Type	SMF/LA/Tubular Maintenance Batteries
Max DC Charging Current from grid	40A
Grid Input	Single phase
Grid Voltage Range	160V-270V
Type of Inverter	Bidirectional Full controlled MOSFET based PWM Inverter
O/P Waveform	Pure sine wave
O/P Power Capacity	2KVA@0.8PF
O/P Voltage	230 + 2% (single phase)
Frequency	50Hz
T.H.D	<3% on Linear Load and <5% on Nonlinear Load
O/P P.F	0.8 lagging to Unity
Inverter Efficiency	>85% on 24VDC/>90% on 48VDC
Overload Capacity	100-120% for 60 sec/ 120-150% for 3o sec
Change Over Time	1-2 sec
Duty	Continuous
Operating Mode	Off-Grid Offline
Noise	50dB at 1 m distance
Operating Temperature	0-50 Deg Celsius
Storage Temperature	Neg 10 Deg Celsius to 55 Deg
Humidity	95% (Non condensing)
Altitude	<1000m above sea level
Enclosure Protection	Ip20
Cooling	Forced Air cooling
Weight	o/P voltage
LCD Metring	O/P current
	I/P Voltage
	I/P Current
Indications	Mains On. Inverter On, PV on
Faults Display	Battery reverse Polarity
	Array Reverse Polarity
Protections	Fuses at Inverter I/P
	Lightining for PV
Pre Alarm	Above protections with alarm

Note: Specifications are subject to change without any prior notice.

*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

MPPT Range - Single Phase: 3KVA/48, 96V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

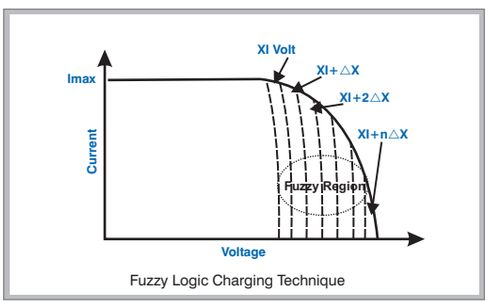
Optional

- Availability of O/P I/P

Displays

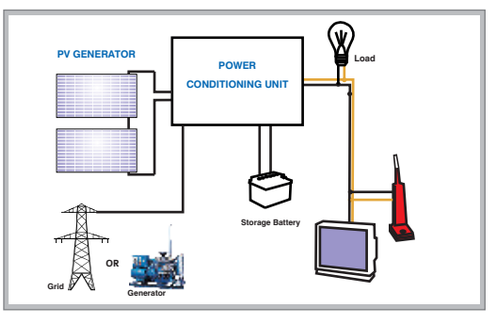
- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

BATTERY CARE CURVE



Fuzzy Logic Charging Technique

SOLAR PCU BASED INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Rating	3KVA
DC voltage	48V/96V
Solar Voltage Range	
MPPT Range	55V-96V/105V-144V
Charge Controller	MPPT based Charge Controller (MPPT rating can be customized as per requirement)
MPPT Rating	90A
Battery DC Voltage	48VDC
Battery Type	SMF/LA/Tubular Maintenance Batteries
Max DC Charging Current from grid	60A
Grid Input	Single phase
Grid Voltage Range	160V-270V
Type of Inverter	Bidirectional Full controlled MOSFET based PWM Inverter
O/P Waveform	Pure sine wave
O/P Power Capacity	3KVA@0.8 PF
O/P Voltage	230 + 2% (single phase)
Frequency	50Hz
T.H.D	<3% on Linear Load and <5% on Nonlinear Load
O/P P.F	0.8 lagging to Unity
Inverter Efficiency	>85% on 24VDC/>90% on 48VDC
Overload Capacity	100-120% for 60 sec/ 120-150% for 3o sec
Change Over Time	1-2 sec
Duty	Continuous
Operating Mode	Off-Grid Offline
Noise	50dB at 1 m distance
Operating Temperature	0-50 Deg Celsius
Storage Temperature	Neg 10 Deg Celsius to 55 Deg
Humidity	95% (Non condensing)
Altitude	<1000m above sea level
Enclosure Protection	Ip20
Cooling	Forced Air cooling
Weight	Grid Voltage
LCD Metring	Grid Current
	Frequency O/P
	Frequency
Indications	Mains On. Inverter On, PV on
Faults Display	O/P overload, Over Temperature, Short Circuit
Protections	AC Over, AC under, DC over, DC under
Pre Alarm	Above protections with alarm

Note: Specifications are subject to change without any prior notice.

*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

MPPT Range - Single Phase: 4 KVA/96V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

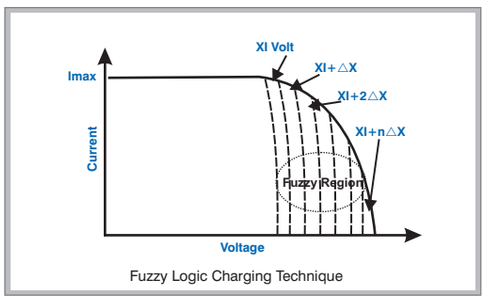
Optional

- Availability of O/P I/P

Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

BATTERY CARE CURVE



Fuzzy Logic Charging Technique

TECHNICAL SPECIFICATIONS

Rating	4KVA
DC Voltage	96V
Solar Voltage Range	108V-200V
Charge Controller	MPPT based Charge Controller
MPPT Rating	Multiples of 100A (customized as per requirement)
Grid Charger Rating	As per systeme and battery capacity
Grid Input	Single Phase
Grid Voltage Range	160V-27-V
Type of Inverter	IGBT based PWM Inverter
O/P Waveform	Pure Sinewave
O/P Power Capacity	Output PF 0.8
O/P Voltage	230 + 10% (single phase)
Frequency	50Hz
T.H.D	<3% on Linear Load <5% on Non linear Load
O/P P.F	0.8 lagging to Unity
Inverter Efficiency	>90%
Overload Capacity	100%-120% for 30 sec 125%-150% for 0 sec
Change Over Time	0 seconds
Duty Cycle	Continuous
Operating Mode	Hybrid Online
Noise	50db at 1m distance
Operating Temperature	0-50 Deg Celsius
Storage Temperature	neg 10 deg Cel to 55 degree celsius
Humdidity	95% non condensing
Altitdue	<1000m above sea level
Enclosure Protection	IP20 or IP21
Cooling	Forced Air cooling
Metering	Solar Voltage, Solar Current, Solar Power
Fault	O/P Under, O/P Over
Protections	MCB at Grid, MCB at Array, MCB at Battery, MCB at O/P
Pre Alarm	Overload & Batter

Note: Specifications are subject to change without any prior notice.
*Higher efficiency with different higher battery voltage configuration available on request

Solar Power Conditioning Unit

Single Phase MPPT Range

MPPT Range - Single Phase: 5KVA/96V

As solar power is scarce so its maximum utilization is of utmost priority. Su-Kam has integrated its high efficient MPPT based charge controller inside the PCU. The optimum efficiency of the Inverter section along with high efficient MPPT charge controller helps generate maximum power from the solar panels. This makes the whole solar systems give maximum output from the same systems.

Working of Solar PCU

- When solar energy is sufficient then total o/p load will operate on solar through MPPT and Inverter. Excess solar power will charge batteries
- When solar energy is weak then Inverter is taking DC source from solar & balance from batteries
- When batteries reach 75% discharge level the o/p load is shifted to grid
- After shifting load to grid (bypass) the batteries are charged from solar energy and if solar energy is not sufficient to charge the batteries, then remaining DC power is taken from gird charges (Inverter is acting as a grid charger in reverse directions so the system is called a bidirectional PCU)
- Once the batteries are fully charged then load is shifted back to Inverter from grid
- During change over from Inverter to grid and if grid supply is not present then again load is shifted to Inverter to use buffer Battery backup.
- When grid returns during Inverter which is working on buffer Battery backup then the load is shifted to grid and batteries are charging through solar or grid as per bi-directional logic

Features

- MPPT based solar charger
- DSP based technology for Inverter
- PWM technology mains grid charger and Inverter with bidirectional operation
- Pure Sinewave output with Low THD

Electronic protection functions

- Pulse by pulse current limiting with auto reset resulting in efficient overload and short circuit protection
- DC Reverse polarity and battery deep discharge protection
- Inbuilt Galvanic isolation transformer
- Solar and grid charging current sharing for maximum solar usage
- Buffer for battery backup in emergency

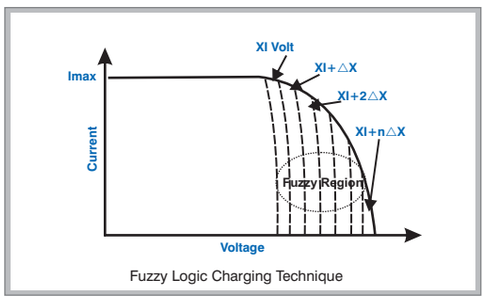
Optional

- Availability of O/P I/P

Displays

- LCD display for metering, I/P & O/P parameters
- Faults Display
- Remote Monitoring Software

BATTERY CARE CURVE

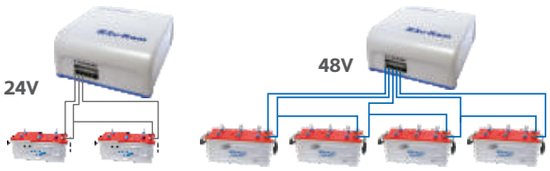


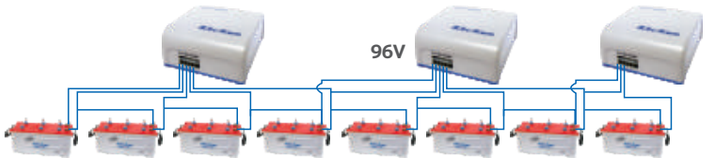
Fuzzy Logic Charging Technique

TECHNICAL SPECIFICATIONS

Rating	5KVA
DC Voltage	96V
Solar Voltage Range	108V-200V
Charge Controller	MPPT based Charge Controller
MPPT Rating	Multiples of 100A (customized as per requirement)
Grid Charger Rating	As per systeme and battery capacity
Grid Input	Single Phase
Grid Voltage Range	160V-27-V
Type of Inverter	IGBT based PWM Inverter
O/P Waveform	Pure Sinewave
O/P Power Capacity	Output PF 0.8
O/P Voltage	230 + 10% (single phase)
Frequency	50Hz
T.H.D	<3% on Linear Load <5% on Non linear Load
O/P P.F	0.8 lagging to Unity
Inverter Efficiency	>90%
Overload Capacity	100%-120% for 30 sec
	125%-150% for 0 sec
Change Over Time	0 seconds
Duty Cycle	Continuous
Operating Mode	Hybrid Online
Noise	50db at 1m distance
Operating Temperature	0-50 Deg Celsius
Storage Temperature	neg 10 deg Cel to 55 degree celsius
Humdidity	95% non condensing
Altitdue	<1000m above sea level
Enclosure Protection	IP20 or IP21
Cooling	Forced Air cooling
Metering	Solar Voltage, Solar Current, Solar Power
Fault	O/P Under, O/P Over
Protections	MCB at Grid, MCB at Array, MCB at Battery, MCB at O/P
Pre Alarm	Overload & Batter

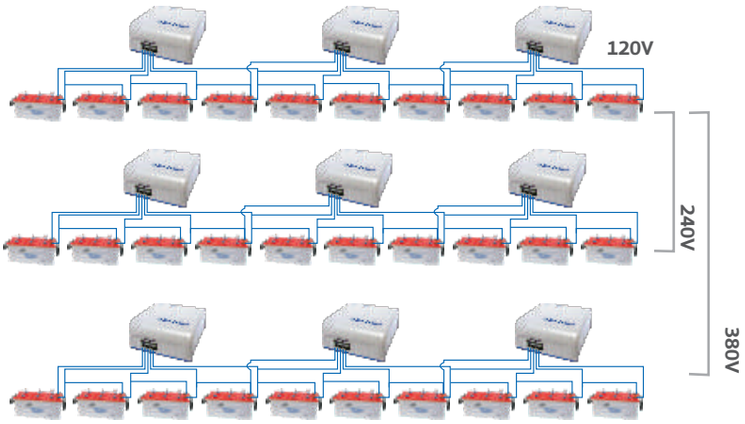
Note: Specifications are subject to change without any prior notice.
*Higher efficiency with different higher battery voltage configuration available on request

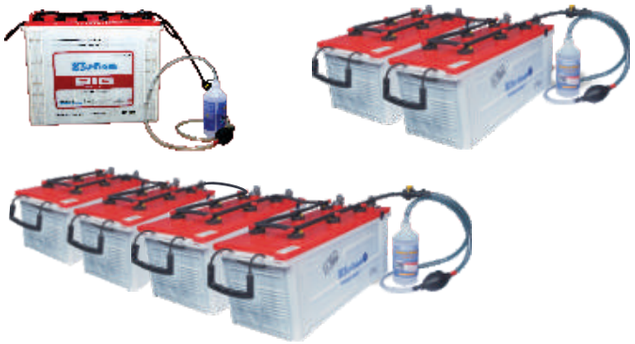




Battery Equalizer

Battery equalizer is a unique product that equalizes two or more batteries in a battery bank connected in series. Battery equalizer enhances the battery life by preventing under charge and over charge of the batteries. Battery equalizer helps you save money by delaying the replacement of your batteries. As you get optimum life from your batteries.





Water Topping Kit

- Single Point multi cell water topping
- Safely fill batteries without removing vent covers.
- Extended battery life & increased performance
- No chances of acid spillage on floors
- Save Battery from under topping and over topping

Trolley

- X-tra durable: Made from tough, long lasting PPCP compound material which does not get destroyed ever if there is leakage / spillage from batteries.
- X-tra convenient: In built ribs for smooth in and out movement of battery without getting stuck.
- X-tra ease of movement: Sturdy yet smooth wheels enabling extra ease of movement while carrying the bulky battery.
- X-tra space saving: Stacks up with Inverter / UPS neatly in a corner, thus taking less space. Aesthetically designed to match
- X-tra safe: Provides good ventilation for battery.

General Recommendation – for alternate current and hybrid system

Sine wave inverters

in contrast to so-called square wave or trapezoidal inverters (grey square curve), Steca sine wave inverters produce a real and precisely controlled sine wave (red sine wave) at their output. the sine wave inverters assure that all loads which are suitable for grid operation can also be operated on a solar home system without any problems.

furthermore, they offer the advantage that no significant noises are produced in the inverter and there is no loud background noise to be heard on a connected radio, for example.

Selecting an inverter

the power of the inverter must be selected according to the way it will be used. the sum of the power of all loads must not exceed the rated power of the inverter. the maximum power of the inverter must be able to cover the starting currents of the loads.

in order to allow the connection of more loads, Steca recommends over dimensioning the inverter.

Selecting the PV generator and solar charge controller

the solar module array has to be adjusted to the local sunlight conditions and the system's energy requirement. in order to avoid stagnation times, the PV generator must also provide enough power during months with little solar radiation in order to cover the requirement of the connected loads. the chosen solar charge controller must also be suitable for the maximum short-circuit current of the PV generator and the maximum load current. In some applications, however, technical properties also play an important role in the choice of solar charge controller.

This may mean that a high-performance solar charge controller with corresponding additional functions is used in a system with a low output. in order to keep the initial investment small, we recommend planning the size of the PV generator and battery according to the current energy consumption and choosing a solar charge controller which will allow the system to be expanded later.

Selecting the battery

in order to also be able to supply loads with high requirements without any problems, the size of the battery must be chosen with care. Some critical loads such as fridges, freezers, pumps and motors need extremely high starting currents in their start- up phases. in order to be able to power such loads, it is important to use a high performance inverter with a high overload capacity, particularly in the start-up phase. the battery must also possess a large enough capacity so that sufficient currents are made available to the inverter in the start-up phase. we recommend choosing the battery size according to the following formula: the battery capacity should be at least five times as large as the rated power of the inverter divided by the rated voltage of the battery.

Cbatt ≥ 5 h * Pnom / Unom Pnom is the rated power of the inverter in watts and unom is the rated voltage of the battery.

Selecting the system voltage

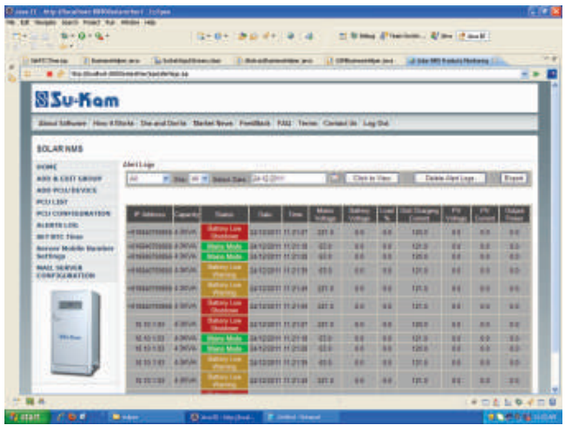
the power requirement of the loads should be the decisive factor when choosing the system voltage. the higher the power, the higher the system voltage. if no 12 V dC loads are connected to the system, a higher system voltage of 24 V or 48 V should be chosen in order to reduce the alternating currents, and thus the losses on the dC side. inverters also generally work more effectively with a higher input voltage. all in all, a higher system voltage leads to the system having a greater efficiency, since losses are reduced

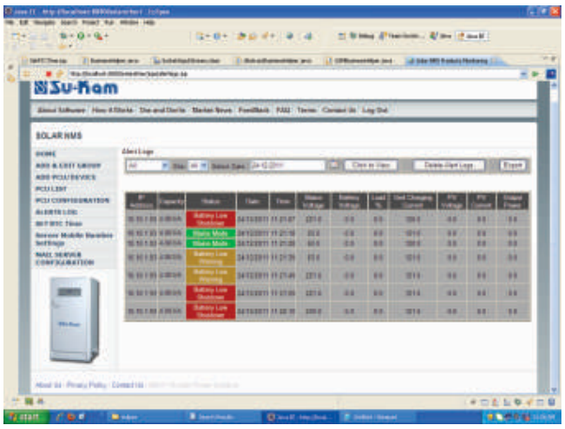
Cable lengths and cross sections

direct currents in inverter systems are typically large. for this reason, it is important to dimension the cables between the battery and the inverter appropriately. always connect the inverter directly to the battery. the cable you use should be as short as possible. in addition, the cable cross section should match the expected flow of current.

in case of doubt, a thicker cable should be chosen. this can have a significant influence on the overall behaviour of the system. using thick and short cables can limit losses and thus allow you to create a system with a better level of efficiency and/or better performance. if the cables on the direct current side of the inverter are included in the delivery, these should not be lengthened, and a smaller cross section should not be used.

PCU Monitoring Software

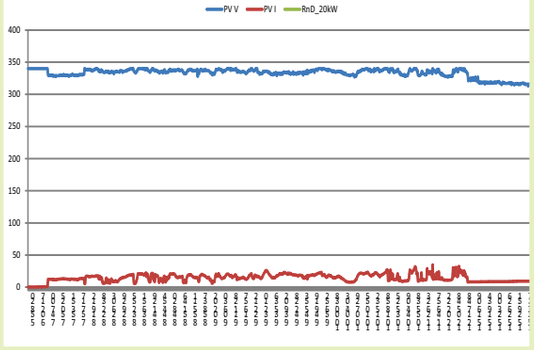


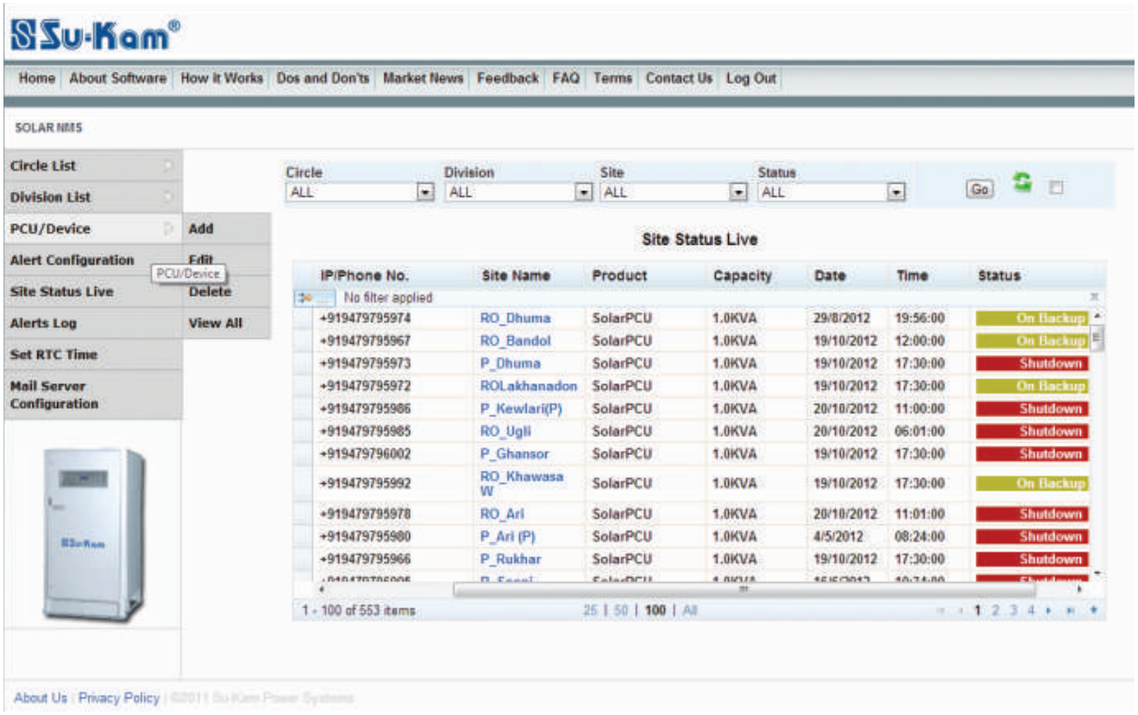


Load Chart 1-10 KVA

Product Capacity	Fan	Tube 40W	TV 21"	CFL 15W	W. Machine	Air Cooler	Refr. 165 ltr	AC 1.5 T	Water Pump 1hp
100VA/12V	1			2					
600VA/24V	2	2	1	4					
1000VA/24V	4	3	2	8					
2000VA/48V	5	4	1	8	0	1	1		
3000VA/96V	6	6	2	10	1		1		1
4000VA/96V	8	8	3	15	1	1	1		1
5000VA/96V	10	10	1	20	1		1	1	
6000VA/96V	15	15	2	20	1	1	1	1	
7500VA/96V	20	20	2	20			1	1	1
1000VA/96V	20	20	2	20	1	1	1	1	1

Indicative values only, actual calculation depends on manufacturer's specification





ORIGINAL

No. 1016

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 219619
Date 10TH NOV. 2008
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to "HIGH FREQUENCY INVERTER" in the name of SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI:-110 046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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*The reciprocity date (if any) which has been allowed and the name of the country.
Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
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DR. I. BANERJEE,
L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of Issue

12 AUG 2009

ORIGINAL

No. 1275

GOVERNMENT OF INDIA
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Design No. 239399
Date 12/09/2011
Reciprocity Date*
Country

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in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
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DR. I. BANERJEE,
L. S. DAVAR & CO., PATENT & TRADE MARK
ATTORNEY 32 RADHA MADHAB DUTTA
GARDEN LANE KOLKATA -700 010.

Date of Issue 14/02/2012 13:52:30

ORIGINAL

No. 13966

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 236650
Date 11/05/2011
Reciprocity Date*
Country

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in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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L. S. DAVAR & CO., PATENT & TRADE MARK
ATTORNEY 32 RADHA MADHAB DUTTA
GARDEN LANE KOLKATA -700 010.

Date of Issue 08/11/2011 12:33:42

ORIGINAL

No. 3532

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 226384
Date 22/12/2009
Reciprocity Date* 00:00:00
Country

Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to SOLAR INVERTER in the name of SUKAM POWER SYSTEMS LTD. OF PLOT NO. WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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C/O. L. S. DAVAR & CO., PATENT & TRADE MARK
ATTORNEYS 32 RADHA MADHAB DUTTA
GARDEN LANE KOLKATA -7000 10.

Date of Issue 19/07/2010 10:20:43
AKS

ORIGINAL

No. 12776

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217395
Date 28TH JULY 2008
Reciprocity date*
Country

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in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

Controller General of Patents, Designs and Trade Marks

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L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
24TH APR, 2009

Patent: High Frequency Inverter
Design No: 21969

ORIGINAL

No. 3811

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 227378
Date 22/02/2010
Reciprocity Date*
Country

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in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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DR. L BANERJEE,
L. S. DAVAR & CO., PATENT & TRADE MARK
ATTORNEY 32 RADHA MADHAB DUTTA GARDEN
LANE KOLKATA -700010

Date of Issue 03/04/2010 10:40:56
AKS

Patent: Solar Home UPS
Design No: 239399

ORIGINAL

No. 11429

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 212080
Date 23RD AUG. 2007
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-99 in respect of the application of such design to "FRONT PANEL OF INVERTER" in the name of SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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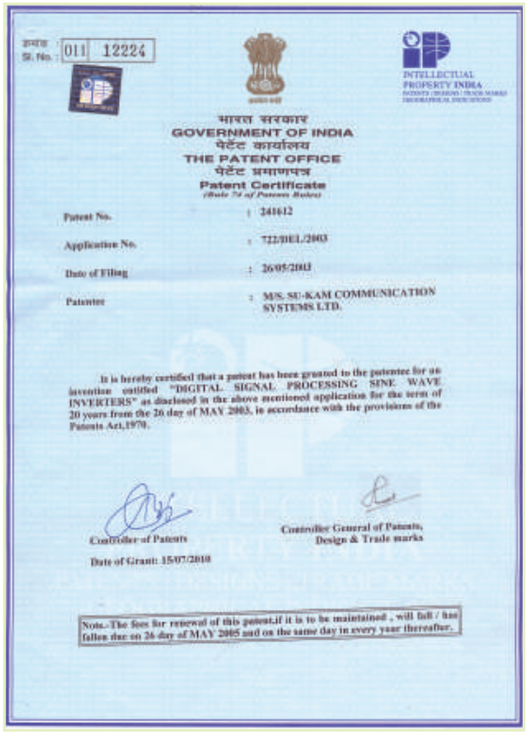
L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of Issue
26TH MAY 2008

Patent: Inverter Design
Design No: 236650



Sl. No. : 011 12224

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
Patent Certificate
(Rule 74 of Patents Rules)

Patent No. : 241612
Application No. : 722/DEL/2003
Date of Filing : 26/05/2003
Patentee : M/S. SU-KAM COMMUNICATION SYSTEMS LTD.

It is hereby certified that a patent has been granted to the patentee for the invention entitled "DIGITAL SIGNAL PROCESSING SINE WAVE INVERTERS" as disclosed in the above mentioned application for the term of 20 years from the 26 day of MAY 2003, in accordance with the provisions of the Patents Act,1970.

Controller of Patents
Controller General of Patents, Design & Trade marks

Date of Grant: 15/07/2010

Note.-The fees for renewal of this patent,if it is to be maintained , will fall / has fallen due on 26 day of MAY 2005 and on the same day in every year thereafter.

Patent: Solar Home Inverter
Design No: 226384

Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 1/1/2013

1. Registration Number : A-95480/2013
2. Name, address and nationality of the applicant : M/S. SU-KAM POWER SYSTEM LTD., 306, KIRTI DEEP BLDG, NANGAL RAYA, NEW DELHI - 110046
3. Nature of the applicant's interest in the copyright of the work : OWNER
4. Class and description of the work : ARTISTIC WORK
5. Title of the work : 4 KVA-96V SOLAR PCU
6. Language of the work : OTHERS
7. Name, address and nationality of the author and if the author is deceased, date of his decease : SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8. Whether the work is published or unpublished : UNPUBLISHED
9. Year and country of first publication and name, address and nationality of the publisher : N.A.
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers : N.A.
11. Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any : SAME AS col. 2
12. Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright : N.A.
13. If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown). : SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
14. Remarks, if any : THIS ARTISTIC WORK NOT TO BE USED IN RELATION TO ANY GOODS

Diary Number : 12128/2010-CO/A
Date of Application : 09/11/2010
Date of Receipt : 09/11/2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright : 4KVA Solar PCU

Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 31/12/2012

1. Registration Number : A-95474/2012
2. Name, address and nationality of the applicant : SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3. Nature of the applicant's interest in the copyright of the work : OWNER
4. Class and description of the work : ARTISTIC WORK
5. Title of the work : PCB LAYOUT OF INVERTER/HUPS/UPS (TEST ZIG)
6. Language of the work : OTHERS
7. Name, address and nationality of the author and if the author is deceased, date of his decease : SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8. Whether the work is published or unpublished : UNPUBLISHED
9. Year and country of first publication and name, address and nationality of the publisher : N.A.
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers : N.A.
11. Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any : SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12. Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright : N.A.
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14. Remarks, if any :

Diary Number : 10936/2010-CO/A
Date of Application : 08/10/2010
Date of Receipt : 08/10/2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB Layout of Inverter (Testing Zig)

Government Of India
Copyright Office
Extract from the Register of Copyrights

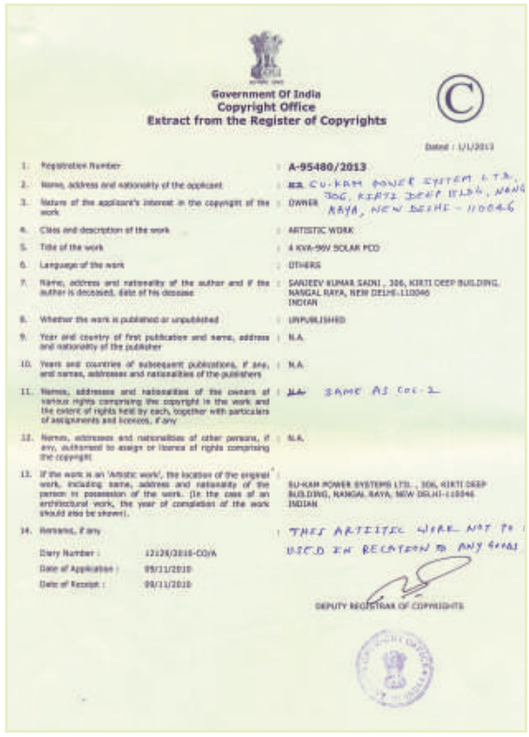
Dated :28/12/2012

1. Registration Number : A-95407/2012
2. Name, address and nationality of the applicant : SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3. Nature of the applicant's interest in the copyright of the work : OWNER
4. Class and description of the work : ARTISTIC WORK
5. Title of the work : PCB LAYOUT OF INVERTER/HUPS/UPS (2 KVA)
6. Language of the work : OTHERS
7. Name, address and nationality of the author and if the author is deceased, date of his decease : SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8. Whether the work is published or unpublished : UNPUBLISHED
9. Year and country of first publication and name, address and nationality of the publisher : N.A.
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers : N.A.
11. Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any : SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12. Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright : N.A.
13. If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown). : SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
14. Remarks, if any :

Diary Number : 10930/2010-CO/A
Date of Application : 08/10/2010
Date of Receipt : 08/10/2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB layout of 2 KVA Inverter



Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 1/1/2013

1. Registration Number : A-95480/2013
2. Name, address and nationality of the applicant : M/S. SU-KAM POWER SYSTEM LTD., 306, KIRTI DEEP BLDG, NANGAL RAYA, NEW DELHI - 110046
3. Nature of the applicant's interest in the copyright of the work : OWNER
4. Class and description of the work : ARTISTIC WORK
5. Title of the work : 4 KVA-96V SOLAR PCU
6. Language of the work : OTHERS
7. Name, address and nationality of the author and if the author is deceased, date of his decease : SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8. Whether the work is published or unpublished : UNPUBLISHED
9. Year and country of first publication and name, address and nationality of the publisher : N.A.
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers : N.A.
11. Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any : SAME AS col. 2
12. Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright : N.A.
13. If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown). : SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
14. Remarks, if any : THIS ARTISTIC WORK NOT TO BE USED IN RELATION TO ANY GOODS

Diary Number : 12128/2010-CO/A
Date of Application : 09/11/2010
Date of Receipt : 09/11/2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB layout of 2 KVA Inverter

ORIGINAL

No. 12031

GOVERNMENT OF INDIA
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CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 236528
Date 03/05/2011
Reciprocity Date*
Country

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L. S. DAVAR & CO., PATENT & TRADE MARK
ATTORNEY 32 RADHA MADHAB DUTTA
GARDEN LANE KOLKATA -700 010.

Date of Issue 28/07/2011 13:12:18

Patent: High Frequency Solar Inverter
Design No: 236528

ORIGINAL

No. 2297

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 225517
Date 27/10/2009
Reciprocity Date* 00:00:00
Country

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DR. I. BANERJEE,
C/O. L. S. DAVAR & CO., PATENT & TRADE
MARK ATTORNEYS 32 RADHA MADHAB DUTTA
GARDEN LANE KOLKATA -700 010

Date of Issue 30/06/2010 13:35:08
ND

Patent: HF Solar Inverter
Design No: 225517

FORM O-F
Duplicate Certificate

भारत सरकार
GOVERNMENT OF INDIA
व्यापार चिन्ह रजिस्ट्री
TRADE MARKS REGISTRY
No. 1034149

व्यापार चिन्ह अधिनियम, 1999
Trade Marks Act, 1999
व्यापार चिन्ह के रजिस्ट्रीकरण का प्रमाणपत्र, धारा 23 (2) नियम 62 (1)
Certificate of Registration of Trade Mark, Section 23 (2) Rule 62 (1)

1634249 28/12/2007 1441

SU-KAM POWER SYSTEMS LTD., AN INDIAN INCORPORATED COMPANY, 84 UDYOG VIHAR PHASE-4 GURGAON HARYANA, INDIA, MANUFACTURER, DISTRIBUTOR & MERCHANT, (Body Incorporate)

8 1634249 26 December 2007
In Class Under No. as of the Date in respect of
Good Description Continued

As Amended

Sealed at my direction, this 13th day of February, 2012

Delhi
Trade Marks Registry

Registrar of Trade Marks

Trademark: Brainy

Trade Mark No. 1634249 Annexure of Certificate No.: 1634149 Date : 28/12/2007 Page 2/2

BRAINY

Class Goods Description

8 SCIENTIFIC, NAUTICAL, SURVEYING, PHOTOGRAPHIC,CINEMATOGRAPHIC, OPTICAL, WEIGHING, MEASURING, SIGNALING, CHECKING, (SUPERVISION), LIFE-SAVING AND TEACHING APPARATUS AND INSTRUMENTS, APPARATUS AND INSTRUMENTS FOR CONDUCTING, SWITCHING, TRANSFORMING, ACCUMULATING, REGULATING OR CONTROLLING ELECTRICITY, APPARATUS FOR RECORDING, TRANSMISSION OR REPRODUCTION OF SOUND OR IMAGES, MAGNETIC DATA CARRIERS, RECORDING DISCS, AUTOMATIC VENDING MACHINES AND MECHANISMS FOR COIN OPERATED APPARATUS, CASH REGISTERS, CALCULATING MACHINES, DATA PROCESSING EQUIPMENT AND COMPUTERS, FIRE-EXTINGUISHING APPARATUS AND ELECTRONIC INVERTERS, BATTERIES, UPS SYSTEMS, SOLAR PRODUCTS, ALL INCLUDED IN CLASS 08.

Trademark: Brainy (pg 2)

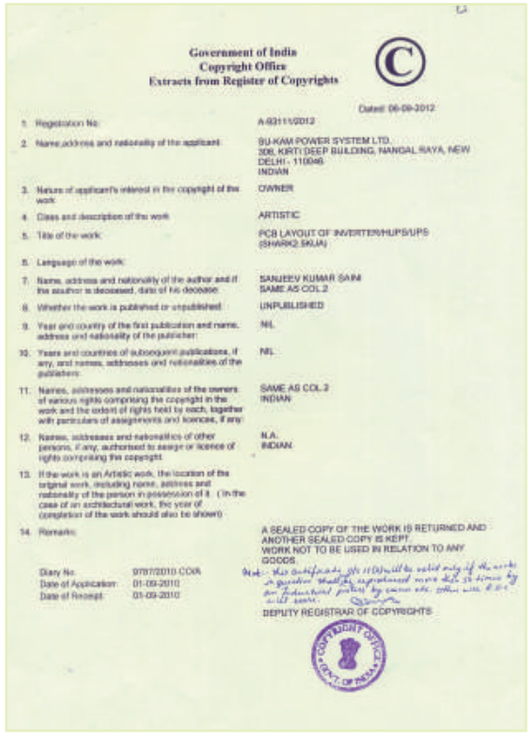
Government Of India
Copyright Office
Extract from the Register of Copyrights

1.	Registration Number	A-95345/2012
2.	Name, address and nationality of the applicant	SU KAM POWER SYSTEM LTD., 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3.	Nature of the applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	ARTISTIC WORK
5.	Title of the work	PCB LAYOUT OF INVERTER OR HUPS OR UPS SOLAR PCU
6.	Language of the work	OTHERS
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI , SU KAM POWER SYSTEM LTD 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SU KAM POWER SYSTEM LTD., 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A.
13.	If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown).	SU KAM POWER SYSTEM LTD., 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
14.	Remarks, if any	

Diary Number : 10939/2010-CO/A
Date of Application : 06/10/2010
Date of Receipt : 06/10/2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB Layout of Solar PCU



Government of India
Copyright Office
Extracts from Register of Copyrights

Dated: 06-09-2012

1.	Registration No.	A-83111/2012
2.	Name,address and nationality of the applicant	SU-KAM POWER SYSTEM LTD. 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI - 110046 INDIAN
3.	Nature of applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	ARTISTIC
5.	Title of the work	PCB LAYOUT OF INVERTER/HUPS/UPS (SHARK2.SKLIA)
6.	Language of the work	
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI SAME AS COL 2
8.	Whether the work is published or unpublished	UNPUBLISHED
9.	Year and country of the first publication and name, address and nationality of the publisher	NIL
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	NIL
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SAME AS COL 2 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A. INDIAN
13.	If the work is an Artistic work, the location of the original work, including name, address and nationality of the person in possession of it (In the case of an architectural work, the year of completion of the work should also be shown)	
14.	Remarks	A SEALED COPY OF THE WORK IS RETURNED AND ANOTHER SEALED COPY IS KEPT WORK NOT TO BE USED IN RELATION TO ANY GOODS.

Diary No. 9787/2010-CO/A
Date of Application 01-09-2010
Date of Receipt 03-09-2010

Note- This certificate will be valid only if the work in question shall be reproduced more than 25 times by an industrial process by you etc. other wise it will void.

DEPUTY REGISTRAR OF COPYRIGHTS

Patent: Solar Home UPS
Design No: 239399

Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated :15/2/2013

1.	Registration Number	L-46639/2013
2.	Name, address and nationality of the applicant	SU KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA NEW DELHI-110046 INDIAN
3.	Nature of the applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	LITERARY/ DRAMATIC WORK
5.	Title of the work	COMMUNICATION VALIDATOR
6.	Language of the work	ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SU KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA NEW DELHI-110046 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A.
13.	If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown).	N.A.
14.	Remarks, if any	

Diary Number : 372/2011-CO/L
Date of Application : 16/01/2011
Date of Receipt : 17/01/2011

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: Communication Validator

Produkte
Products

TÜVRheinland®

Prüfbericht - Nr.: 01100025 001
Test Report No.:

Seite 1 von 13
Page 1 of 13

Auftraggeber: *Client:*	Su-Kam Power Systems Limited, Plot No.54, Udyog Vihar, Phase-6, Sector-37, Gurgaon-122 001, Haryana (India)
Gegenstand der Prüfung: *Test item:*	Solar Power Conditioning Unit (Inverter with integrated MPPT solar charge controller and grid battery charger)
Bezeichnung: *Identification:*	PCU100H24 — **Serien-Nr.:** *Serial No.:* 001E077521060312000 1
Wareneingangs-Nr.: *Receipt No.:*	1403016553 — **Eingangsdatum:** *Date of receipt:* 2012.03.07
Prüfort: *Testing location:*	TÜV Rheinland (India) Pvt. Ltd. 82/A, West Wing, 3rd Main Road, Electronic City Phase 1, Bangalore – 560 100
Prüfgrundlage: *Test specification:*	IEC60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30 (As per customer specifications)
Prüfergebnis: *Test Result:*	Refer section " Summery of testing"
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland (India) Pvt. Ltd. 82/A, West Wing, 3rd Main Road, Electronic City Phase 1, Bangalore – 560 100

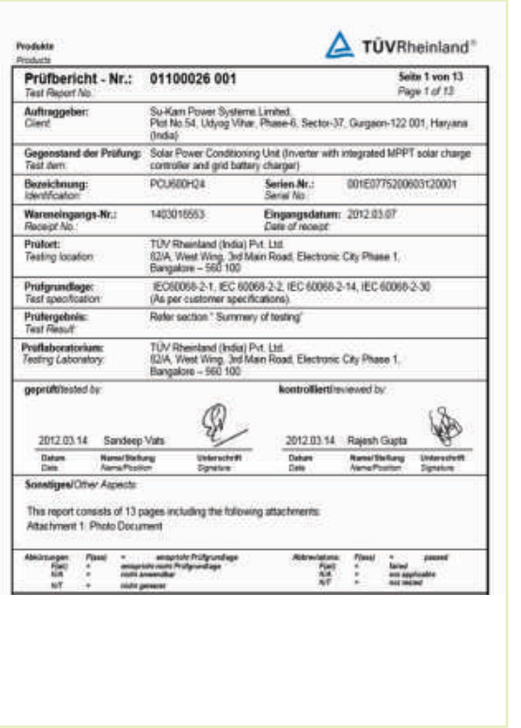
geprüft/*tested by:* — **kontrolliert/***reviewed by:*

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature	Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
2012.03.14	Sandeep Vats		2012.03.14	Rajesh Gupta	

Sonstiges/*Other Aspects:*

This report consists of 13 pages including the following attachments:
Attachment 1: Photo Document

TUV: Solar PCU 100VA with MPPT



Produkte
Products

TÜVRheinland®

Prüfbericht - Nr.: 01100026 001
Test Report No.:

Seite 1 von 13
Page 1 of 13

Auftraggeber: *Client:*	Su-Kam Power Systems Limited, Plot No.54, Udyog Vihar, Phase-6, Sector-37, Gurgaon-122 001, Haryana (India)
Gegenstand der Prüfung: *Test item:*	Solar Power Conditioning Unit (Inverter with integrated MPPT solar charge controller and grid battery charger)
Bezeichnung: *Identification:*	PCU600H24 — **Serien-Nr.:** *Serial No.:* 001E077520060312000 1
Wareneingangs-Nr.: *Receipt No.:*	1403016553 — **Eingangsdatum:** *Date of receipt:* 2012.03.07
Prüfort: *Testing location:*	TÜV Rheinland (India) Pvt. Ltd. 82/A, West Wing, 3rd Main Road, Electronic City Phase 1, Bangalore – 560 100
Prüfgrundlage: *Test specification:*	IEC60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30 (As per customer specifications)
Prüfergebnis: *Test Result:*	Refer section " Summery of testing"
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland (India) Pvt. Ltd. 82/A, West Wing, 3rd Main Road, Electronic City Phase 1, Bangalore – 560 100

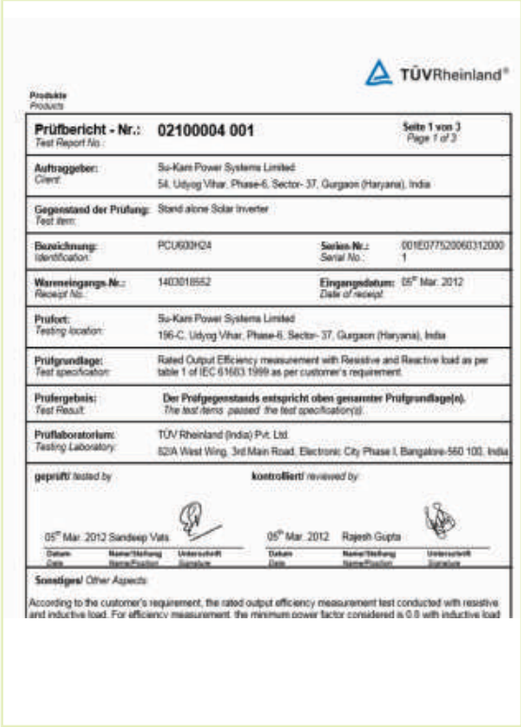
geprüft/*tested by:* — **kontrolliert/***reviewed by:*

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature	Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
2012.03.14	Sandeep Vats		2012.03.14	Rajesh Gupta	

Sonstiges/*Other Aspects:*

This report consists of 13 pages including the following attachments:
Attachment 1: Photo Document

TUV: solar PCU 600VA with MPPT



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Produkte
Products

Prüfbericht - Nr.: 02100004 001
Test Report No.:

Seite 1 von 3
Page 1 of 3

Auftraggeber: *Client:*	Su-Kam Power Systems Limited 54, Udyog Vihar, Phase-6, Sector- 37, Gurgaon (Haryana), India
Gegenstand der Prüfung: *Test item:*	Stand alone Solar Inverter
Bezeichnung: *Identification:*	PCU600H24 — **Serien-Nr.:** *Serial No.:* 001E077520060312000 1
Wareneingangs-Nr.: *Receipt No.:*	1403016552 — **Eingangsdatum:** *Date of receipt:* 05th Mar. 2012
Prüfort: *Testing location:*	Su-Kam Power Systems Limited 196-C, Udyog Vihar, Phase-6, Sector- 37, Gurgaon (Haryana), India
Prüfgrundlage: *Test specification:*	Rated Output Efficiency measurement with Resistive and Reactive load as per table 1 of IEC 61683:1999 as per customer's requirement.
Prüfergebnis: *Test Result:*	**Der Prüfgegenstands entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland (India) Pvt. Ltd. 82/A West Wing, 3rd Main Road, Electronic City Phase I, Bangalore-560 100, India

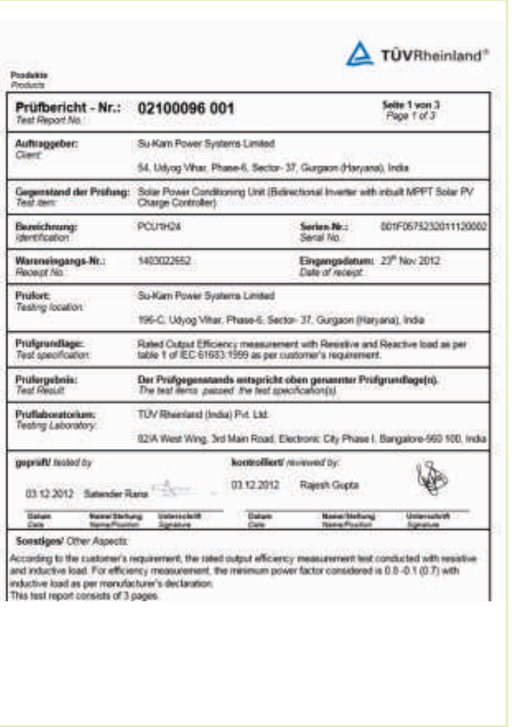
geprüft/ *tested by* — **kontrolliert/** *reviewed by*

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature	Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
05th Mar. 2012	Sandeep Vats		05th Mar. 2012	Rajesh Gupta	

Sonstiges/ *Other Aspects:*

According to the customer's requirement, the rated output efficiency measurement test conducted with resistive and inductive load. For efficiency measurement, the minimum power factor considered is 0.8 with inductive load

TUV: Standalone Solar PCU 600VA



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Produkte
Products

Prüfbericht - Nr.: 02100096 001
Test Report No.:

Seite 1 von 3
Page 1 of 3

Auftraggeber: *Client:*	Su-Kam Power Systems Limited 54, Udyog Vihar, Phase-6, Sector- 37, Gurgaon (Haryana), India
Gegenstand der Prüfung: *Test item:*	Solar Power Conditioning Unit (Bidirectional Inverter with inbuilt MPPT Solar PV Charge Controller)
Bezeichnung: *Identification:*	PCU1H24 — **Serien-Nr.:** *Serial No.:* 001F057523011120002
Wareneingangs-Nr.: *Receipt No.:*	1403022652 — **Eingangsdatum:** *Date of receipt:* 23rd Nov 2012
Prüfort: *Testing location:*	Su-Kam Power Systems Limited 196-C, Udyog Vihar, Phase-6, Sector- 37, Gurgaon (Haryana), India
Prüfgrundlage: *Test specification:*	Rated Output Efficiency measurement with Resistive and Reactive load as per table 1 of IEC 61683:1999 as per customer's requirement.
Prüfergebnis: *Test Result:*	**Der Prüfgegenstands entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland (India) Pvt. Ltd. 82/A West Wing, 3rd Main Road, Electronic City Phase I, Bangalore-560 100, India

geprüft/ *tested by* — **kontrolliert/** *reviewed by:*

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature	Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
03.12.2012	Satender Rana		03.12.2012	Rajesh Gupta	

Sonstiges/ *Other Aspects:*

According to the customer's requirement, the rated output efficiency measurement test conducted with resistive and inductive load. For efficiency measurement, the minimum power factor considered is 0.8 -0.1 (0.7) with inductive load as per manufacturer's declaration.
This test report consists of 3 pages.

TUV: Solar PCU 1KVA with MPPT

SOLAR INVERTER

The solar inverter is a critical component in a solar energy system. It performs the conversion of the variable DC output of the Photovoltaic (PV) module(s) into a clean sine wave 50 AC current that is then applied directly to the commercial electrical grid or to a local, off-grid electrical network. Stand-alone inverters, used in isolated systems where the inverter draws its DC energy from batteries charged by photovoltaic arrays. Many stand-alone inverters also incorporate integral battery chargers to replenish the battery from an AC source, when available. Normally these do not interface in any way with the utility grid, and as such, are not required to have anti-islanding protection.

At the heart of the inverter is a real-time microcontroller. The controller executes the very precise algorithms required to invert the DC voltage generated by the solar module into AC. This controller is programmed to perform the control loops necessary for all the power management functions necessary including DC/DC and DC/AC. The PV maximum output power is dependent on the operating conditions and varies from moment to moment due to temperature, shading, soilage, cloud cover, and time of day so tracking and adjusting for this maximum power point is a continuous process. For systems with battery energy storage, the controller can control the charging as well as switch over to battery power once the sun sets or cloud cover reduces the PV output power.

Su-kam Solar Inverter is a combination of an inverter, battery charger and transfer switch into one complete system. The systems has the priority of setting the charging from Solar Panels and reduces the charging through grid.The inverter will allow optimizing the solar power with having extremely low idle current and having option of remotely monitoring the power and battery helps customer to evaluate the performace of the systems.

SOLAR INVERTER

Standalone-High Frequency Solar Inverter

100VA/12V, 300VA/12V, 400VA/12V,
500VA/24V, 750VA/24V,
1600VA/48V, 2000VA/48V

Off-Grid Solar Inverter-1 phase In-1 phase out

5KVA/48V, 5KVA/96V, 7.5KVA/120V, 10KVA/180V

Off-Grid Solar Inverter-3 phase In-3phase out

20KVA/240V, 30KVA/240V, 15KVA/360V,
40KVA/360V, 50KVA/360V, 100KVA/360V

Solar Inverter

High Frequency Solar Inverter

Product Code: INV-SL-SW-012AA-00100

High Frequency Range - 100 VA/12V

When energy supply from electric utility is not possible, economic or desirable, PV systems can be installed economically as stand-alone high frequency systems.

Working Principle

In a stand-alone high frequency PV system, the energy storage in the batteries and the operation of numerous consumers is realized using direct current. This gives you an opportunity to define and have the desired backup depending upon your requirement by using batteries.

Features

- High Total Efficiency & Reliability
- Pure sine wave output
- Low Total Harmonic Distortion (THD) < 3%*
- Micro-controller based design
- Noiseless operation
- High Surge Capability

Display/Indications

- Easy-to-read system status
- Low battery
- Overload
- Short-circuit
- Inverter ON

Protections

- Overload Protection
- Short circuit protection
- Battery pole reversal protection
- Battery deep discharge protection
- High temperature
- Over/under input voltage protection

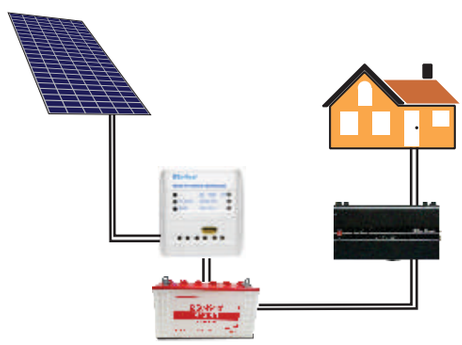
Convenience

- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Lightweight and compact design
- Wall mounting option available

Applications

- Solar high frequency inverters can be used in areas where there no supply of grid electricity.
- Standalone Solar Systems
- Hybrid Solar Solutions

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 14”	-	1	-
FAN	1	-	-
Tube light	-	-	1
CFL	2	-	2

Indicative values only, actual calculation depends on manufacturer's specification

Solar Inverter

High Frequency Solar Inverter

TECHNICAL SPECIFICATIONS

Model	100VA/12V
Rated Power	100VA
Nominal Input Voltage	12VDC
Input Voltage Range (DC)	10.5-15.5VDC
Battery Low Alarm	10.7VDC
Battery Low Shutdown	10.5VDC
OUTPUT	
Efficiency	>82%
Output Voltage	120VAC, 60Hz / 220VAC, 50Hz
Voltage Regulation	±3% to ±10% RMS
Frequency Regulation	60Hz ± 0.1Hz / 50Hz ± 0.1Hz
Output Waveform	Sine Wave
THD	<5% (On Linear Loads)
Overload	Above 100%
Protection	Overload, short circuit, Reverse polarity through DC fuse, Over/Under input voltage, Over temperature
GENERAL	
Operating Temperature Range	0°C to + 40°C
Storage Temperature Range	0°C to +55°C
Thermal Management / Cooling	Controlled Forced air cooling
Relative Humidity	0-95% Non-Condensing
INDICATIONS	Low Battery, Overload / Short Circuit, Inverter ON

Specifications are subject to change without prior notice.

Recommended Balance of Solar System

Solar Charge Controller		Battery		Solar Panel	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
5Amp/12V	10Amp/12V	50Ah	100Ah	100W	200W

Solar Conversion Kit

In remote areas where people use the standalone solar systems have normally an issue of less charging during the winter or foggy season when they need the power most. Su-kam offers another high efficiency battery charger that gives the customer an option of charging there batteries through one more AC sources I e; grid or generators. This systems enables a customer to charge their batteries and use the available power during the night as well.

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries This is also compatible with any solar systems. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Solar Inverter

High Frequency Solar Inverter

Product Code: INS-OT-SW-012AA-00300

High Frequency Range - 300 VA/12V

When energy supply from electric utility is not possible, economic or desirable, PV systems can be installed economically as stand-alone high frequency systems.

Working Principle

In a stand-alone high frequency PV system, the energy storage in the batteries and the operation of numerous consumers is realized using direct current. This gives you an opportunity to define and have the desired backup depending upon your requirement by using batteries.

Features

- High Total Efficiency & Reliability
- Pure sine wave output
- Low Total Harmonic Distortion (THD) < 3%*
- Micro-controller based design
- Noiseless operation
- High Surge Capability

Display/Indications

- Easy-to-read system status
- Low battery
- Overload
- Short-circuit
- Inverter ON

Protections

- Overload Protection
- Short circuit protection
- Battery pole reversal protection
- Battery deep discharge protection
- High temperature
- Over/under input voltage protection

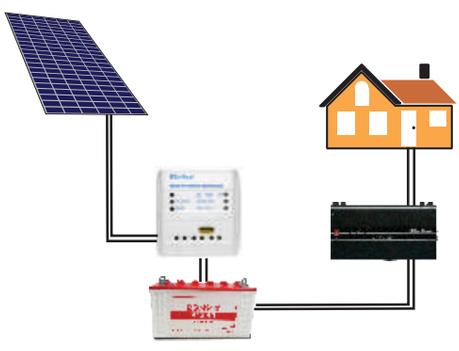
Convenience

- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Lightweight and compact design
- Wall mounting option available

Applications

- Solar high frequency inverters can be used in areas where there no supply of grid electricity.
- Standalone Solar Systems

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 14”	1	1	-
FAN	1	-	-
Tube light	-	1	-
CFL	2	2	3
Computer	-	-	1

Indicative values only, actual calculation depends on manufacturer's specification

Solar Inverter

High Frequency Solar Inverter

TECHNICAL SPECIFICATIONS

Model	300VA12V
Rated Power	300VA
Nominal Input Voltage	12VDC
Input Voltage Range (DC)	10.5-15.5VDC
Battery Low Alarm	10.7VDC
Battery Low Shutdown	10.5VDC
OUTPUT	
Efficiency	82%
Output Voltage	120VAC, 60Hz / 220VAC, 50Hz
Voltage Regulation	±3% to ±10% RMS
Frequency Regulation	60Hz ± 0.1Hz / 50Hz ± 0.1Hz
Output Waveform	Sine Wave
THD	<5% (On Linear Loads)
Overload	Above 100%
Protection	Overload, short circuit, Reverse polarity through DC fuse, Over/Under input voltage, Over temperature
GENERAL	
Operating Temperature Range	0°C to + 40°C
Storage Temperature Range	0°C to +55°C
Thermal Management / Cooling	Controlled Forced air cooling
Relative Humidity	0-95% Non-Condensing
INDICATIONS	Low Battery, Overload / Short Circuit, Inverter ON

Specifications are subject to change without prior notice.

Recommended Balance of Solar System

Solar Charge Controller		Battery		Solar Panel	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
5Amp/12V	10Amp/12V	100Ah	135Ah	100W	200W

Solar Conversion Kit

In remote areas where people use the standalone solar systems have normally an issue of less charging during the winter or foggy season when they need the power most. Su-kam offers another high efficiency battery charger that gives the customer an option of charging there batteries through one more AC sources I e; grid or generators. This systems enables a customer to charge their batteries and use the available power during the night as well.

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries This is also compatible with any solar systems. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Solar Inverter

High Frequency Solar Inverter

Product Code: INS-SI-OT-012AA-00400

High Frequency Range - 400 VA/12V

When energy supply from electric utility is not possible, economic or desirable, PV systems can be installed economically as stand-alone high frequency systems.

Working Principle

In a stand-alone high frequency PV system, the energy storage in the batteries and the operation of numerous consumers is realized using direct current. This gives you an opportunity to define and have the desired backup depending upon your requirement by using batteries.

Features

- High Total Efficiency & Reliability
- Pure sine wave output
- Low Total Harmonic Distortion (THD) < 3%*
- Micro-controller based design
- Noiseless operation
- High Surge Capability

Display/Indications

- Easy-to-read system status
- Low battery
- Overload
- Short-circuit
- Inverter ON

Protections

- Overload Protection
- Short circuit protection
- Battery pole reversal protection
- Battery deep discharge protection
- High temperature
- Over/under input voltage protection

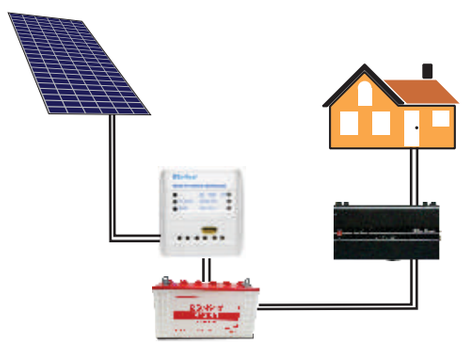
Convenience

- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Lightweight and compact design
- Wall mounting option available

Applications

- Solar high frequency inverters can be used in areas where there no supply of grid electricity.
- Standalone Solar Systems
- Hybrid Solar Solutions

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 14”	1	-	1
FAN	1	2	-
Tube light	1	-	2
CFL	2	2	4
Computer	-	1	-

Indicative values only, actual calculation depends on manufacturer's specification

Solar Inverter

High Frequency Solar Inverter

TECHNICAL SPECIFICATIONS

Model	400VA/12V
Rated Power	400VA
Nominal Input Voltage	12VDC
Input Voltage Range (DC)	10.5-15.5VDC
Battery Low Alarm	10.7VDC
Battery Low Shutdown	10.5VDC
OUTPUT	
Efficiency	82%
Output Voltage	120VAC, 60Hz / 220VAC, 50Hz
Voltage Regulation	±3% to ±10% RMS
Frequency Regulation	60Hz ± 0.1Hz / 50Hz ± 0.1Hz
Output Waveform	Sine Wave
THD	<5% (On Linear Loads)
Overload	Above 100%
Protection	Overload, short circuit, Reverse polarity through DC fuse, Over/Under input voltage, Over temperature
GENERAL	
Operating Temperature Range	0°C to + 40°C
Storage Temperature Range	0°C to +55°C
Thermal Management / Cooling	Controlled Forced air cooling
Relative Humidity	0-95% Non-Condensing
INDICATIONS	Low Battery, Overload / Short Circuit, Inverter ON

Specifications are subject to change without prior notice.

Recommended Balance of Solar System

Solar Charge Controller		Battery		Solar Panel	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
5Amp/12V	20Amp/12V	100Ah	135Ah	100W	400W

Solar Conversion Kit

In remote areas where people use the standalone solar systems have normally an issue of less charging during the winter or foggy season when they need the power most. Su-kam offers another high efficiency battery charger that gives the customer an option of charging there batteries through one more AC sources I e; grid or generators. This systems enables a customer to charge their batteries and use the available power during the night as well.

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries This is also compatible with any solar systems. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Solar Inverter

High Frequency Solar Inverter

Product Code: INS-SI-OT-024AA-00500

High Frequency Range - 500 VA/24V

When energy supply from electric utility is not possible, economic or desirable, PV systems can be installed economically as stand-alone high frequency systems.

Working Principle

In a stand-alone high frequency PV system, the energy storage in the batteries and the operation of numerous consumers is realized using direct current. This gives you an opportunity to define and have the desired backup depending upon your requirement by using batteries.

Features

- High Total Efficiency & Reliability
- Pure sine wave output
- Low Total Harmonic Distortion (THD) < 3%*
- Micro-controller based design
- Noiseless operation
- High Surge Capability

Display/Indications

- Easy-to-read system status
- Low battery
- Overload
- Short-circuit
- Inverter ON

Protections

- Overload Protection
- Short circuit protection
- Battery pole reversal protection
- Battery deep discharge protection
- High temperature
- Over/under input voltage protection

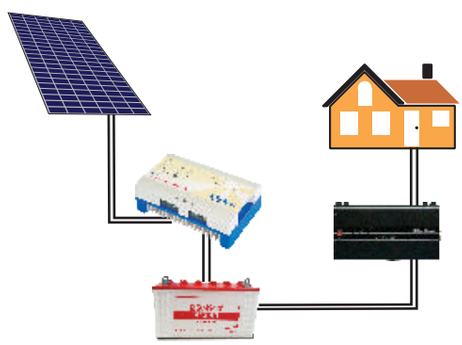
Convenience

- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Lightweight and compact design
- Wall mounting option available

Applications

- Solar high frequency inverters can be used in areas where there no supply of grid electricity.
- Standalone Solar Systems
- Hybrid Solar Solutions

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 14”	1	-	-
FAN	2	1	2
Tube light	1	1	2
CFL	4	4	6
Computer	-	1	-

Indicative values only, actual calculation depends on manufacturer's specification

Solar Inverter

High Frequency Solar Inverter

TECHNICAL SPECIFICATIONS

Model	500VA/24V
Rated Power	500VA
INPUT	
Nominal Input Voltage	24VDC
Input Voltage Range (DC)	21.0-31.0VDC
Battery Low Alarm	21.5VDC
Battery Low Shutdown	21.0VDC
OUTPUT	
Efficiency	82%
Output Voltage	120VAC, 60Hz / 220VAC, 50Hz
Voltage Regulation	±3% to ±10% RMS
Frequency Regulation	60Hz ± 0.1Hz / 50Hz ± 0.1Hz
Output Waveform	Sine Wave
THD	<5% (On Linear Loads)
Overload	Above 100%
Protection	Overload, short circuit, Reverse polarity through DC fuse, Over/Under input voltage, Over temperature
GENERAL	
Operating Temperature Range	0°C to + 40°C
Storage Temperature Range	0°C to +55°C
Thermal Management / Cooling	Controlled Forced air cooling
Relative Humidity	0-95% Non-Condensing
INDICATIONS	Low Battery, Overload / Short Circuit, Inverter ON

Specifications are subject to change without prior notice.

Recommended Balance of Solar System

Solar Charge Controller		Battery		Solar Panel	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
5Amp/24V	20Amp/24V	150Ah	165Ah	100W	500W

Solar Conversion Kit

In remote areas where people use the standalone solar systems have normally an issue of less charging during the winter or foggy season when they need the power most. Su-kam offers another high efficiency battery charger that gives the customer an option of charging there batteries through one more AC sources I e; grid or generators. This systems enables a customer to charge their batteries and use the available power during the night as well.

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries This is also compatible with any solar systems. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Solar Inverter

High Frequency Solar Inverter

Product Code: INS-SI-OT-024AA-00750

High Frequency Range - 750 VA/24V

When energy supply from electric utility is not possible, economic or desirable, PV systems can be installed economically as stand-alone high frequency systems.

Working Principle

In a stand-alone high frequency PV system, the energy storage in the batteries and the operation of numerous consumers is realized using direct current. This gives you an opportunity to define and have the desired backup depending upon your requirement by using batteries.

Features

- High Total Efficiency & Reliability
- Pure sine wave output
- Low Total Harmonic Distortion (THD) < 3%*
- Micro-controller based design
- Noiseless operation
- High Surge Capability

Display/Indications

- Easy-to-read system status
- Low battery
- Overload
- Short-circuit
- Inverter ON

Protections

- Overload Protection
- Short circuit protection
- Battery pole reversal protection
- Battery deep discharge protection
- High temperature
- Over/under input voltage protection

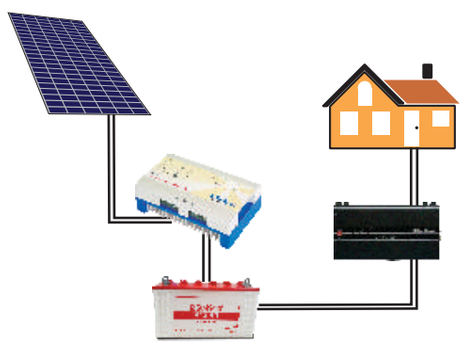
Convenience

- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Lightweight and compact design
- Wall mounting option available

Applications

- Solar high frequency inverters can be used in areas where there no supply of grid electricity.
- Standalone Solar Systems
- Hybrid Solar Solutions

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 14”	1	-	-
FAN	2	2	3
Tube light	2	2	3
CFL	6	4	8
Computer	-	1	-

Indicative values only, actual calculation depends on manufacturer's specification

High Frequency Solar Inverter

TECHNICAL SPECIFICATIONS

Model	750VA/24V
Rated Power	750VA
INPUT	
Nominal Input Voltage	24VDC
Input Voltage Range (DC)	21.0-31.0VDC
Battery Low Alarm	21.5VDC
Battery Low Shutdown	21.0VDC
OUTPUT	
Efficiency	82%
Output Voltage	120VAC, 60Hz / 220VAC, 50Hz
Voltage Regulation	±3% to ±10% RMS
Frequency Regulation	60Hz ± 0.1Hz / 50Hz ± 0.1Hz
Output Waveform	Sine Wave
THD	<5% (On Linear Loads)
Overload	Above 100%
Protection	Overload, short circuit, Reverse polarity through DC fuse, Over/Under input voltage, Over temperature
GENERAL	
Operating Temperature Range	0°C to + 40°C
Storage Temperature Range	0°C to +55°C
Thermal Management / Cooling	Controlled Forced air cooling
Relative Humidity	0-95% Non-Condensing
INDICATIONS	Low Battery, Overload / Short Circuit, Inverter ON

Specifications are subject to change without prior notice.

Recommended Balance of Solar System

Solar Charge Controller		Battery		Solar Panel	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
5Amp/24V	30Amp/24V	135Ah	150Ah	100W	750W

Solar Conversion Kit

In remote areas where people use the standalone solar systems have normally an issue of less charging during the winter or foggy season when they need the power most. Su-kam offers another high efficiency battery charger that gives the customer an option of charging there batteries through one more AC sources I e; grid or generators. This systems enables a customer to charge their batteries and use the available power during the night as well.

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries This is also compatible with any solar systems. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Solar Inverter

High Frequency Solar Inverter

Product Code: INS-OT-SW-048AA-01600

High Frequency Range - 1600 VA/48V

When energy supply from electric utility is not possible, economic or desirable, PV systems can be installed economically as stand-alone high frequency systems.

Working Principle

In a stand-alone high frequency PV system, the energy storage in the batteries and the operation of numerous consumers is realized using direct current. This gives you an opportunity to define and have the desired backup depending upon your requirement by using batteries.

Features

- High Total Efficiency & Reliability
- Pure sine wave output
- Low Total Harmonic Distortion (THD) < 3%*
- Micro-controller based design
- Noiseless operation
- High Surge Capability

Display/Indications

- Easy-to-read system status
- Low battery
- Overload
- Short-circuit
- Inverter ON

Protections

- Overload Protection
- Short circuit protection
- Battery pole reversal protection
- Battery deep discharge protection
- High temperature
- Over/under input voltage protection

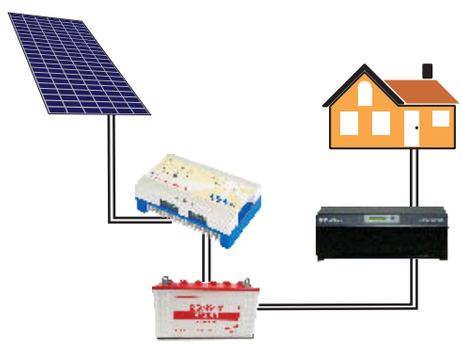
Convenience

- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Lightweight and compact design
- Wall mounting option available

Applications

- Solar high frequency inverters can be used in areas where there no supply of grid electricity.
- Standalone Solar Systems
- Hybrid Solar Solutions

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 14”	2	-	-
FAN	4	4	6
Tube light	5	4	7
CFL	10	10	10
Computer	-	2	-

Indicative values only, actual calculation depends on manufacturer's specification

High Frequency Solar Inverter

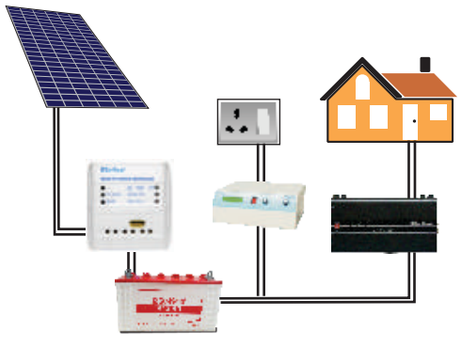
TECHNICAL SPECIFICATIONS

Model	1600VA/48V
Rated Power	1600VA
INPUT	
Nominal Input Voltage	48VDC
Input Voltage Range (DC)	43.0-60.0VDC
Battery Low Alarm	43.5VDC
Battery Low Shutdown	43.0VDC
OUTPUT	
Efficiency	85%
Output Voltage	220VAC, 50Hz
Voltage Regulation	±3% to ±10% RMS
Frequency Regulation	50Hz ± 0.1Hz
Output Waveform	Sine Wave
THD	<5% (On Linear Loads)
Overload	Above 100%
Protection	Overload, short circuit, Reverse polarity through DC fuse, Over/Under input voltage, Over temperature
GENERAL	
Operating Temperature Range	0°C to + 40°C
Storage Temperature Range	0°C to +55°C
Thermal Management / Cooling	Controlled Forced air cooling
Relative Humidity	0-95% Non-Condensing
Dimensions-WxDxH (in mm)	515x250x150
Weight (in kgs.)	9.7Kg
LCD Display	Output Voltage, Load Level, Battery Level, Low Battery, Overload, Short Circuit, Inverter ON etc.

Specifications are subject to change without prior notice.

Recommended Balance of Solar System

Solar Charge Controller		Battery		Solar Panel	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
5Amp/48V	30Amp/48V	150Ah	165Ah	100W	1500W



Solar Conversion Kit

In remote areas where people use the standalone solar systems have normally an issue of less charging during the winter or foggy season when they need the power most. Su-kam offers another high efficiency battery charger that gives the customer an option of charging there batteries through one more AC sources I e; grid or generators. This systems enables a customer to charge their batteries and use the available power during the night as well.

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries This is also compatible with any solar systems. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Solar Inverter

High Frequency Solar Inverter

Product Code: INS-SI-OT-048AA-02000

High Frequency Range - 2000 VA/48V

When energy supply from electric utility is not possible, economic or desirable, PV systems can be installed economically as stand-alone high frequency systems.

Working Principle

In a stand-alone high frequency PV system, the energy storage in the batteries and the operation of numerous consumers is realized using direct current. This gives you an opportunity to define and have the desired backup depending upon your requirement by using batteries.

Features

- High Total Efficiency & Reliability
- Pure sine wave output
- Low Total Harmonic Distortion (THD) < 3%*
- Micro-controller based design
- Noiseless operation
- High Surge Capability

Display/Indications

- Easy-to-read system status
- Low battery
- Overload
- Short-circuit
- Inverter ON

Protections

- Overload Protection
- Short circuit protection
- Battery pole reversal protection
- Battery deep discharge protection
- High temperature
- Over/under input voltage protection

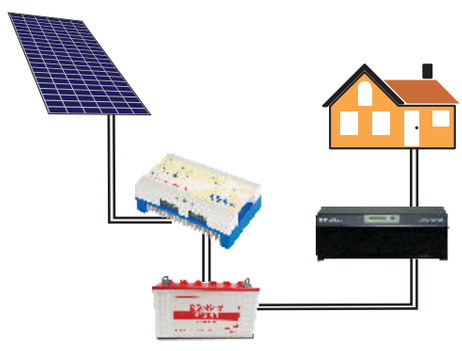
Convenience

- Life cycle service & support – Rapid support anywhere through Su-Kam's extensive service network.
- Lightweight and compact design
- Wall mounting option available

Applications

- Solar high frequency inverters can be used in areas where there no supply of grid electricity.
- Standalone Solar Systems
- Hybrid Solar Solutions

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 14”	2	-	-
FAN	4	4	6
Tube light	5	4	7
CFL	10	10	10
Computer	-	2	-

Indicative values only, actual calculation depends on manufacturer's specification

High Frequency Solar Inverter

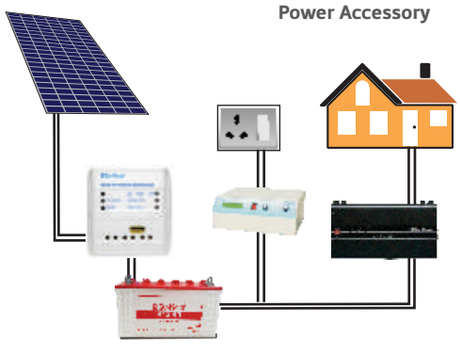
TECHNICAL SPECIFICATIONS

Model	2000VA/48V
Rated Power	2000VA
INPUT	
Nominal Input Voltage	48VDC
Input Voltage Range (DC)	42.0-60.0VDC
Battery Low Alarm	43.5VDC
Battery Low Shutdown	43.0VDC
OUTPUT	
Efficiency	85%
Output Voltage	220VAC, 50Hz
Voltage Regulation	±3% to ±10% RMS
Frequency Regulation	50Hz ± 0.1Hz
Output Waveform	Sine Wave
THD	<5% (On Linear Loads)
Overload	Above 100%
Protection	Overload, short circuit, Reverse polarity through DC fuse, Over/Under input voltage, Over temperature
GENERAL	
Operating Temperature Range	0°C to + 40°C
Storage Temperature Range	0°C to +55°C
Thermal Management / Cooling	Controlled Forced air cooling
Relative Humidity	0-95% Non-Condensing
Dimensions-WxDxH (in mm)	515x250x150
Weight (in kgs.)	12.2Kg
LCD Display	Output Voltage, Load Level, Battery Level, Low Battery, Overload, Short Circuit, Inverter ON etc.

Specifications are subject to change without prior notice.

Recommended Balance of Solar System

Solar Charge Controller		Battery		Solar Panel	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
5Amp/12V	10Amp/12V	100Ah	200Ah	100W	200W



Power Accessory

Solar Conversion Kit

In remote areas where people use the standalone solar systems have normally an issue of less charging during the winter or foggy season when they need the power most. Su-kam offers another high efficiency battery charger that gives the customer an option of charging there batteries through one more AC sources I e; grid or generators. This systems enables a customer to charge their batteries and use the available power during the night as well.

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries This is also compatible with any solar systems. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Solar Inverter

1phase In - 1phase out

LCD MESSAGES (1 Phase Products)

SU-KAM WELCOMES YOU	SELF TEST IN PROGRESS ...	AUTO CALIBRATION PASS	DSP TEST: O.K
SYSTEM CAPACITY 5KVA-96V DC	H/W REV.: 1.2 01 S/W REV.: 12.07.7	SERVICE: support@ su-kam.com	MAINS ON BATTERY CHARGING
I/P VOLT: 228.7 V I/P FREQ: 50.1 Hz	BATT. LEVEL: 83% BATTERY CHARGING	BATT. LEVEL: 51% [■■■■■]	O/P LOAD: 87% [■■■■■■■■■■]

Range - 5KVA/48V

Product Code: SLR-SI-SS-048AA-05000

A healthier alternative to Generators

Su-Kam's DSP Solar Sine Wave Inverter is a highly efficient Inverter having the solar priority on the system. The inverter is designed to first charge through the panel and thereafter through grid if available. The low THD and low no load current in system helps optimizing its performance. The isolation transformer in the system takes care of the effect of neutral issues.

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps, shopping malls to name a few.

Principle : Su-Kam solar inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

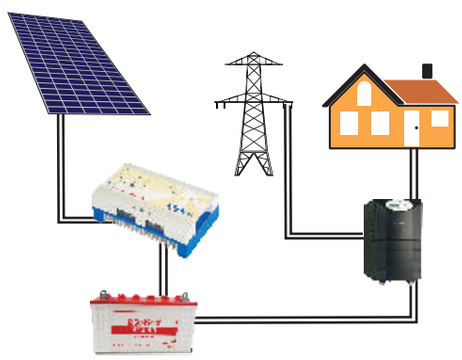
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 21"	-	4	1
Room Cooler	-	1	-
Tube light	20	15	4
FAN	20	10	4
CFL	30	15	20
AC (1.5 T)	-	-	1

Indicative values only, actual calculation depends on manufacturer's specification

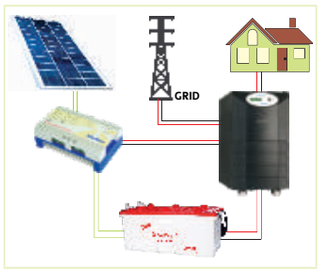
Solar Inverter

1phase In - 1phase out

TECHNICAL SPECIFICATIONS

Type	1 Phase in - 1 Phase out
Series	Pure Sine Wave Inverter
Technology	DSP based PWM technology using IGBT
Ratings	5KVA
Model No.	
INPUT PARAMETERS	
Input Supply	1 Phase, 3 Wire
Voltage Range	110-280VAC
Frequency Range	45-55 Hz
Power Factor (charging)	0.85 to 0.90
OUTPUT PARAMETERS	
Voltage Regulation	220V ± 5%
Frequency Regulation	50.0Hz ± 0.1Hz
Peak Efficiency	>87%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion	< 3% (For Linear Loads)
Crest Factor	> 3:1
Transient Response	
Overload Handling Capacity	101% for 100 Sec, 160% for 10 sec
BATTERY PARAMETERS	
Cell/Battery Type	12V/100-200Ah
Battery Voltage (Nominal)	48V
Battery Charging Current	6A - 20A ± 1AMP. (Expandable up to 30AMP)
USER INTERFACE	
Communication Port	N/A
Operating System	N/A
Remote Monitoring	N/A
ENVIRONMENTAL PARAMETERS	
Operating Temperature	< 45°C
Acoustic Noise (at 1mts)	< 50dB
Relative Humidity	Max 95% non-condensing
OTHERS	
Indications & Alarm	Backlit 16 x 2 Lines LCD Screen with Indications, Alarms & Remedy
Protection Class	IP20
Dimensions-WxHxD (in mm)	350x325x580
Weight (in kgs)	50

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

1phase In - 1phase out

LCD MESSAGES (1 Phase Products)

SU-KAM WELCOMES YOU	SELF TEST IN PROGRESS ...	AUTO CALIBRATION PASS	DSP TEST: O.K
SYSTEM CAPACITY 5KVA-96V DC	H/W REV.: 1.2 01 S/W REV.: 12.07.7	SERVICE: support@ su-kam.com	MAINS ON BATTERY CHARGING
I/P VOLT: 228.7 V I/P FREQ: 50.1 Hz	BATT. LEVEL: 83% BATTERY CHARGING	BATT. LEVEL: 51% [■■■■■■]	O/P LOAD: 87% [■■■■■■■■■■]

Range - 5KVA/96V

Product Code: SLR-SI-SS-096AA-05000

A healthier alternative to Generators

Su-Kam's DSP Solar Sine Wave Inverter is a highly efficient Inverter having the solar priority on the system. The inverter is designed to first charge through the panel and thereafter through grid if available. The low THD and low no load current in system helps optimizing its performance. The isolation transformer in the system takes care of the effect of neutral issues.

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps, shopping malls to name a few.

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Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

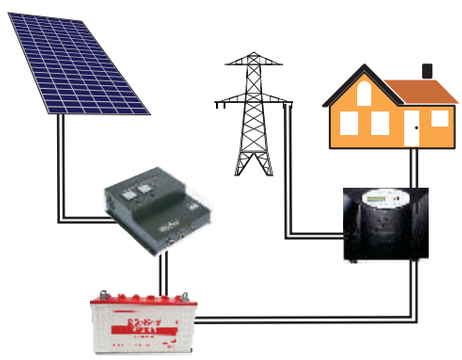
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 21"	-	4	1
Room Cooler	-	1	-
Tube light	20	15	4
FAN	20	10	4
CFL	30	15	20
AC (1.5 T)	-	-	1

Indicative values only, actual calculation depends on manufacturer's specification

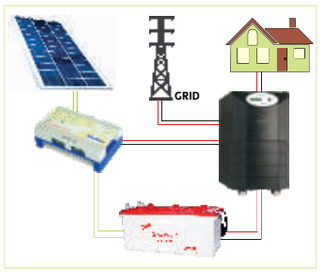
Solar Inverter

1phase In - 1phase out

TECHNICAL SPECIFICATIONS

Type	1 Phase in - 1 Phase out
Series	Pure Sine Wave Inverter
Technology	DSP based PWM technology using IGBT
Ratings	5KVA
Model No.	
INPUT PARAMETERS	
Input Supply	1 Phase, 3 Wire
Voltage Range	140-280VAC
Frequency Range	45-55 Hz
Power Factor (charging)	0.85 to 0.90
OUTPUT PARAMETERS	
Voltage Regulation	220V ± 5%
Frequency Regulation	50.0Hz ± 0.1Hz
Peak Efficiency	>87%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion	< 3% (For Linear Loads)
Crest Factor	> 3:1
Transient Response	
Overload Handling Capacity	101% for 100 Sec, 160% for 10 sec
BATTERY PARAMETERS	
Cell/Battery Type	12V/100-200Ah
Battery Voltage (Nominal)	96V
Battery Charging Current	6A - 20A ± 1AMP. 6A - 20A ± 1AMP.
USER INTERFACE	
Communication Port	N/A
Operating System	N/A
Remote Monitoring	N/A
ENVIRONMENTAL PARAMETERS	
Operating Temperature	< 45°C
Acoustic Noise (at 1mts)	< 50dB
Relative Humidity	Max 95% non-condensing
OTHERS	
Indications & Alarm	Backlit 16 x 2 Lines LCD Screen with Indications, Alarms & Remedy
Protection Class	IP20
Dimensions-WxHxD (in mm)	350x325x580
Weight (in kgs)	50

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

1phase In - 1phase out

TECHNICAL SPECIFICATIONS

Mains AC Low Cut	140V ± 5V
Mains AC Low Cut Recovery	150V ± 5V
Mains AC High Cut	280V ± 5V
Mains AC High Cut Recovery	270V ± 5V
Max. Mains to Inverter Change Over Time	<50 mSec
Max. Inverter to Mains Change Over Time	<20 mSec
Charging Current (Settable By Jumper)	7A / 10A / 15A / 20A (± 2A)
Waveform in Inverter Mode	SINE WAVE
Max. Output at Inverter Mode	220V ± 10V
Output Frequency in Inverter Mode	50.0Hz ± 0.5Hz
Full Load	4000W (+ 150W) Resistive Load OR (18.1A + 1.0A)
Over Load Protection with (102%-200% Load)	5 MINUTES TO 15SEC ±10%
Short Circuit Protection	>300% LOAD
Short Circuit Current Peak	400A ±15% FOR 8 Msec. ±2Msec.
Recommended Battery Voltage / Capacity	120V / 100Ah-200Ah
Battery Charger Boost Voltage (In case of tubular Battery)	144.0V ± 1V
Battery Charger Boost Voltage (In case of SMF/LA Battery)	142.0V ± 1V
Max. Battery Charger Float Voltage	137.0V ± 1V
Battery Low Cut Warning	112.5V ± 1V for Export / 108.0V ± 1V for Domestic
Battery Low Cut Point	110V ± 1V for Export / 105.0V ± 1V for Domestic
Efficiency in Inverter Mode (at 100% Resistive Load)	> 85%
Mains Input Power Factor in Charging Mode	0.78 to 0.95
Total Harmonic Distortion (at 100% Linear Load)	< 5%
Dimension W X D X H (mm)	350mm x 625mm x 325mm
Weight without Packing (Kg)	49Kg.
Noise Level	<50dB
Operating Temperature	0°C to 45°C
Display	16 X 2 LINES LCD
Communication	Optional

Specifications are subject to change without prior notice.

Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

1phase In - 1phase out

LCD MESSAGES (1 Phase Products)

SU-KAM WELCOMES YOU	SELF TEST IN PROGRESS ...	AUTO CALIBRATION PASS	DSP TEST: O.K
SYSTEM CAPACITY 5KVA-96V DC	H/W REV.: 1.2 01 S/W REV.: 12.07.7	SERVICE: support@ su-kam.com	MAINS ON BATTERY CHARGING
I/P VOLT: 228.7 V I/P FREQ: 50.1 Hz	BATT. LEVEL: 83% BATTERY CHARGING	BATT. LEVEL: 51% [■■■■■■]	O/P LOAD: 87% [■■■■■■■■■■]

Range - 7.5KVA/120V

Product Code: SLR-SI-SS-120AA-07500

A healthier alternative to Generators

Su-Kam's DSP Solar Sine Wave Inverter is a highly efficient Inverter having the solar priority on the system. The inverter is designed to first charge through the panel and thereafter through grid if available. The low THD and low no load current in system helps optimizing its performance. The isolation transformer in the system takes care of the effect of neutral issues.

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps, shopping malls to name a few.

Principle : Su-Kam solar inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

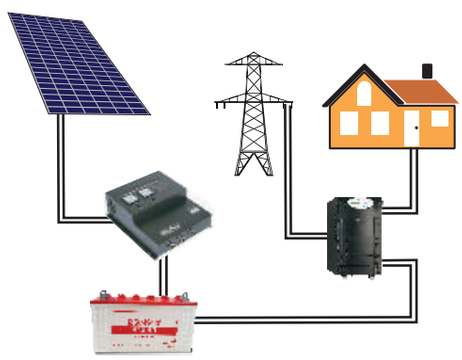
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 21"	-	6	2
Room Cooler	1	-	2
Tube light	25	20	10
FAN	20	20	10
CFL	40	20	20
AC (1.5 T)	-	-	1

Indicative values only, actual calculation depends on manufacturer's specification

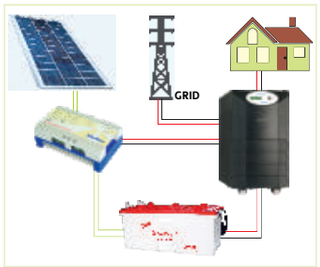
Solar Inverter

1phase In - 1phase out

TECHNICAL SPECIFICATIONS

Type	1 Phase in - 1 Phase out
Series	Pure Sine Wave Inverter
Technology	DSP based PWM technology using IGBT
Ratings	7.5KVA
Model No.	
INPUT PARAMETERS	
Input Supply	1 Phase, 3 Wire
Voltage Range	110-280VAC
Frequency Range	45-55 Hz
Power Factor (charging)	0.85 to 0.90
OUTPUT PARAMETERS	
Voltage Regulation	220V ± 5%
Frequency Regulation	50.0Hz ± 0.1Hz
Peak Efficiency	>87%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion	< 3% (For Linear Loads)
Crest Factor	> 3:1
Transient Response	
Overload Handling Capacity	101% for 100 Sec, 160% for 10 sec
BATTERY PARAMETERS	
Cell/Battery Type	12V/100-200Ah
Battery Voltage (Nominal)	120V
Battery Charging Current	6A - 20A ± 1AMP (Expandable up to 30AMP)
USER INTERFACE	
Communication Port	N/A
Operating System	N/A
Remote Monitoring	N/A
ENVIRONMENTAL PARAMETERS	
Operating Temperature	< 45°C
Acoustic Noise (at 1mts)	< 50dB
Relative Humidity	Max 95% non-condensing
OTHERS	
Indications & Alarm	Backlit 16 x 2 Lines LCD Screen with Indications, Alarms & Remedy
Protection Class	IP20
Dimensions-WxHxD (in mm)	350x615x525
Weight (in kgs)	77

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

1phase In - 1phase out

LCD MESSAGES (1 Phase Products)

SU-KAM WELCOMES YOU	SELF TEST IN PROGRESS ...	AUTO CALIBRATION PASS	DSP TEST: O.K
SYSTEM CAPACITY 5KVA-96V DC	H/W REV.: 1.2 01 S/W REV.: 12.07.7	SERVICE: support@ su-kam.com	MAINS ON BATTERY CHARGING
I/P VOLT: 228.7 V I/P FREQ: 50.1 Hz	BATT. LEVEL: 83% BATTERY CHARGING	BATT. LEVEL: 51% [■■■■■■]	O/P LOAD: 87% [■■■■■■■■■■]

Product Code: SLR-SI-SS-180AA-10000

Range - 10KVA/180V

A healthier alternative to Generators

Su-Kam's DSP Solar Sine Wave Inverter is a highly efficient Inverter having the solar priority on the system. The inverter is designed to first charge through the panel and thereafter through grid if available. The low THD and low no load current in system helps optimizing its performance. The isolation transformer in the system takes care of the effect of neutral issues.

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps, shopping malls to name a few.

Principle : Su-Kam solar inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

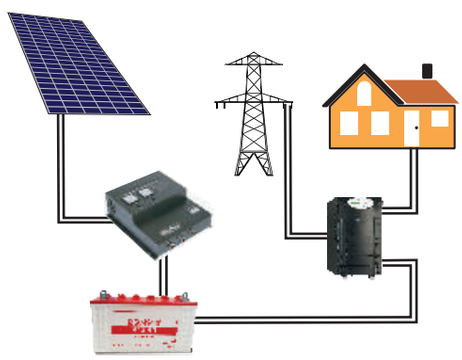
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 21"	-	7	2
Room Cooler	1	1	4
Tube light	40	25	15
FAN	35	20	15
CFL	40	25	10
AC (1.5 T)	-	-	2

Indicative values only, actual calculation depends on manufacturer's specification

Solar Inverter

1phase In - 1phase out

TECHNICAL SPECIFICATIONS

Type	1 Phase in - 1 Phase out
Series	Pure Sine Wave Inverter
Technology	DSP based PWM technology using IGBT
Ratings	10KVA
Model No.	
INPUT PARAMETERS	
Input Supply	1 Phase, 3 Wire
Voltage Range	110-280VAC
Frequency Range	45-55 Hz
Power Factor (charging)	0.85 to 0.90
OUTPUT PARAMETERS	
Voltage Regulation	220V ± 5%
Frequency Regulation	50.0Hz ± 0.1Hz
Peak Efficiency	>90%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion	< 3% (For Linear Loads)
Crest Factor	> 3:1
Transient Response	
Overload Handling Capacity	101% for 100 Sec, 160% for 10 sec
BATTERY PARAMETERS	
Cell/Battery Type	12V/100-200Ah
Battery Voltage (Nominal)	180V
Battery Charging Current	6A - 20A ± 1AMP (Expandable up to 30AMP)
USER INTERFACE	
Communication Port	N/A
Operating System	N/A
Remote Monitoring	N/A
ENVIRONMENTAL PARAMETERS	
Operating Temperature	< 45°C
Acoustic Noise (at 1mts)	< 50dB
Relative Humidity	Max 95% non-condensing
OTHERS	
Indications & Alarm	Backlit 16 x 2 Lines LCD Screen with Indications, Alarms & Remedy
Protection Class	IP20
Dimensions-WxHxD (in mm)	350x615x525
Weight (in kgs)	98

Specifications are subject to change without prior notice.

Panel Range: 5000Wp. maximum, Battery 12Vx4

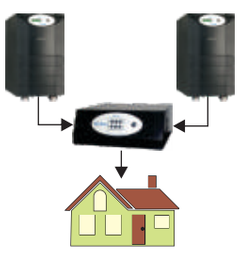
Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Single Phase Static Bypass Switch

The single phase electronic static bypass switch provides continuous power to the load by utilizing two independent power sources; the switch monitors both sources continuously to provide the better of the two available power sources to the electrical load connected at the output. It operates with two UPS or non-UPS power sources (grid or Generator) providing a sinusoidal output. In case power from one source is cut off, the hot swap function of input sources i.e. servicing of one of the sources can be done without interrupting the power flow to load. It has a Fast Transfer Time with High surge current capability that enables minimal changeover time between switchovers. The single phase electronic static bypass switch is highly useful in critical applications (exp. Hospital/IT equipment) that require zero switchover time in case of power cuts.



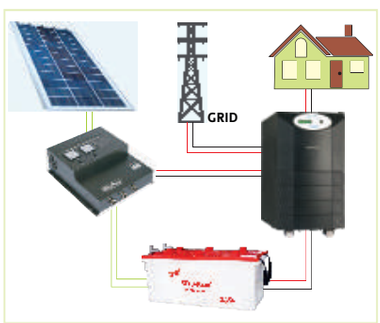
Solar Inverter

1phase In - 1phase out

TECHNICAL SPECIFICATIONS

Mains AC Low Cut	140V ± 5V
Mains AC Low Cut Recovery	150V ± 5V
Mains AC High Cut	280V ± 5V
Mains AC High Cut Recovery	270V ± 5V
Max. Mains to Inverter Change Over Time	<50 mSec
Max. Inverter to Mains Change Over Time	<20 mSec
Charging Current (Settable By Jumper)	7A / 10A / 15A / 20A (± 2A)
Waveform in Inverter Mode	SINE WAVE
Max. Output at Inverter Mode	220V ± 10V
Output Frequency in Inverter Mode	50.0Hz ± 0.5Hz
Full Load	8000W (+ 150W) Resistive Load OR (36.4 A +1A)
Over Load Protection with (102%-200% Load)	5 MINUTES TO 15 Sec. ±10%
Short Circuit Protection	>300% LOAD
Short Circuit Current Peak	400A ±15% FOR 8 Msec. ±2Msec.
Recommended Battery Voltage / Capacity	180V / 100Ah-200Ah
Battery Charger Boost Voltage (In case of tubular Battery)	288.0V ± 2V
Battery Charger Boost Voltage (In case of SMF/LA Battery)	284V ± 2V
Max. Battery Charger Float Voltage	274V ± 2V
Battery Low Cut Warning	224V ± 2V for Export / 216V ± 1V for Domestic
Battery Low Cut Point	220V ± 2V for Export / 210V ± 1V for Domestic
Efficiency in Inverter Mode (at 100% Resistive Load)	> 88%
Mains Input Power Factor in Charging Mode	0.78 to 0.95
Total Harmonic Distortion (at 100% Linear Load)	< 5%
Noise Level	<50dB
Operating Temperature	0°C to 45°C
Display	16 X 2 LINES LCD
Communication	Optional

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

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Single Phase Static Bypass Switch

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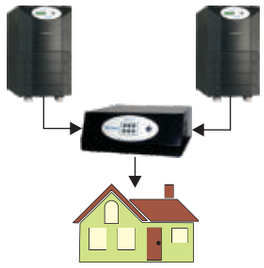


Solar Inverter

3phase In - 3phase out

LCD MESSAGES

SU-KAM WELCOMES YOU	SELF TEST IN PROGRESS ...	AUTO CALIBRATION PASS	DSP TEST: O.K
SYSTEM CAPACITY 7.5KVA-120V DC	H/W REV.: 1.2 01 S/W REV.: 12.07.7	SERVICE: support@ su-kam.com	MAINS ON BATTERY CHARGING
I/P VOLT: 228.7 V I/P FREQ: 50.1 Hz	BATT. LEVEL: 83% BATTERY CHARGING	BATT. LEVEL: 51% [■■■■■]	O/P LOAD: 87% [■■■■■■■■■■]

Range - 15KVA/360V

Product Code: SLR-SI-SS-360CB-15000

A healthier alternative to Generators

Su-Kam DSP Sine Wave Solar Inverter is suitable for widest range of applications in industrial, large commercial having 3 phase supply. The design criterion is to produce a balanced pure sine wave output with optimal efficiency. A unique high start-up power coupled with built-in transformer makes 3 phase inverter highly reliable and capable for wide applications

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps and shopping malls to name a few.

Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

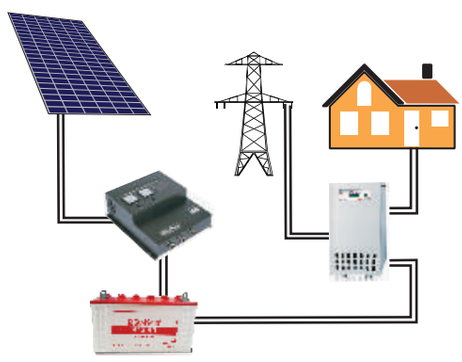
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

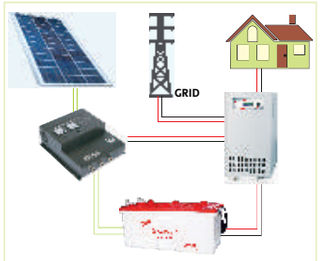
	A	B	C
TV 21"	10	5	2
Room Cooler	-	-	4
Tube light	50	25	20
FAN	40	25	20
CFL	50	40	15
AC (1.5 T)	-	1	2

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	15KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3Sec
Max. Inverter to mains change over time	≤1Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter mode at 100% Load	≥90%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion at linear load	<5 %
Crest Factor	3:01
Full load output Power	12KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	450mm x 740mm x735mm
Weight (Kg) Without Packing (approx.)	160Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

3phase In - 3phase out

LCD MESSAGES

SU-KAM WELCOMES YOU	SELF TEST IN PROGRESS ...	AUTO CALIBRATION PASS	DSP TEST: O.K
SYSTEM CAPACITY 7.5KVA-120V DC	H/W REV.: 1.2 01 S/W REV.: 12.07.7	SERVICE: support@ su-kam.com	MAINS ON BATTERY CHARGING
I/P VOLT: 228.7 V I/P FREQ: 50.1 Hz	BATT. LEVEL: 83% BATTERY CHARGING	BATT. LEVEL: 51% [■■■■■]	O/P LOAD: 87% [■■■■■■■■■■]

Range - 20KVA/360V

Product Code: SLR-SI-SS-360CB-20000

A healthier alternative to Generators

Su-Kam DSP Sine Wave Solar Inverter is suitable for widest range of applications in industrial, large commercial having 3 phase supply. The design criterion is to produce a balanced pure sine wave output with optimal efficiency. A unique high start-up power coupled with built-in transformer makes 3 phase inverter highly reliable and capable for wide applications

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps and shopping malls to name a few.

Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

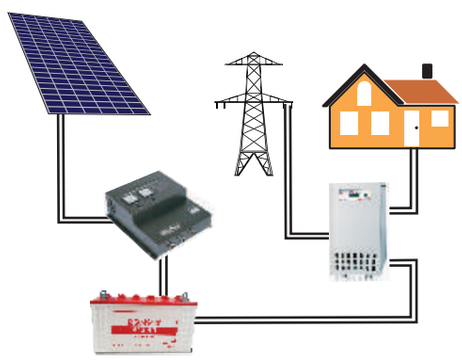
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 21"	-	10	5
Room Cooler	-	5	5
Tube light	80	40	20
FAN	80	40	20
CFL	80	40	20
AC (1.5 T)	-	-	2

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	20KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3Sec
Max. Inverter to mains change over time	≤1Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter mode at 100% Load	≥90%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion at linear load	<5 %
Crest Factor	3:01
Full load output Power	16KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	450mm x 740mm x735mm
Weight (Kg) Without Packing (approx.)	190Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.

Transformer Technology

Su-Kam's new transformer design based on S2 technology, is more efficient and reliable for power back-up systems. S2 transformer technology takes minimum power from the battery and gives maximum output in load which is why user takes maximum back-up from the HUPS.

Solar Inverter

3phase In - 3phase out

LCD MESSAGES

Range - 25KVA/360V

Product Code: SLR-SI-SS-360CB-25000

A healthier alternative to Generators

Su-Kam DSP Sine Wave Solar Inverter is suitable for widest range of applications in industrial, large commercial having 3 phase supply. The design criterion is to produce a balanced pure sine wave output with optimal efficiency. A unique high start-up power coupled with built-in transformer makes 3 phase inverter highly reliable and capable for wide applications

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps and shopping malls to name a few.

Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

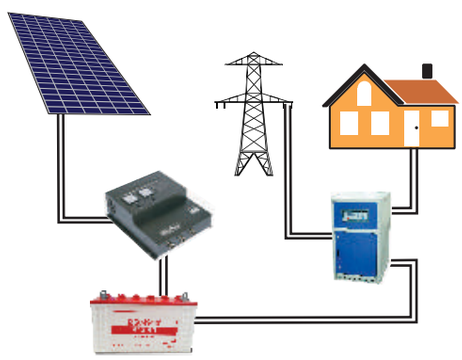
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

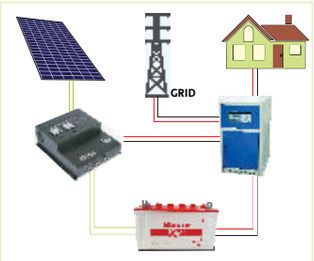
	A	B	C
TV 21"	-	20	5
Room Cooler	-	-	5
Tube light	100	60	25
FAN	100	60	25
CFL	100	60	25
AC (1.5 T)	-	-	3

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	25KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3Sec
Max. Inverter to change over time	≤1Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter	≥92%
mode at 100% Load	
Output Waveform	Pure Sine Wave
Total Harmonic Distortion	<5 %
at linear load	
Crest Factor	3:01
Full load output Power	20KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	600mm x 780mm x1000 mm
Weight (Kg) Without Packing (approx.)	240Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

3phase In - 3phase out

LCD MESSAGES

Range - 30KVA/360V

Product Code: SLR-SI-SS-360CB-30000

A healthier alternative to Generators

Su-Kam DSP Sine Wave Solar Inverter is suitable for widest range of applications in industrial, large commercial having 3 phase supply. The design criterion is to produce a balanced pure sine wave output with optimal efficiency. A unique high start-up power coupled with built-in transformer makes 3 phase inverter highly reliable and capable for wide applications

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps and shopping malls to name a few.

Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

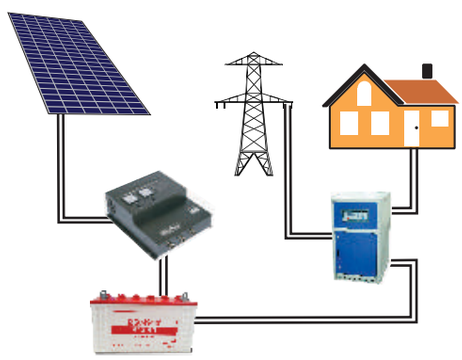
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

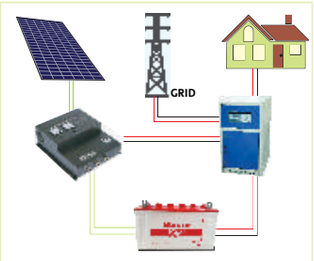
	A	B	C
TV 21"	-	10	7
Room Cooler	-	7	7
Tube light	110	45	30
FAN	110	45	30
CFL	110	45	30
AC (1.5 T)	-	-	3

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	30KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3Sec
Max. Inverter to change over time	≤1Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter	≥92%
mode at 100% Load	
Output Waveform	Pure Sine Wave
Total Harmonic Distortion	<5 %
at linear load	
Crest Factor	3:01
Full load output Power	24KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	600mm x 780mm x1000 mm
Weight (Kg) Without Packing (approx.)	285Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

3phase In - 3phase out

LCD MESSAGES

Range - 40KVA/360V

Product Code: SLR-SI-SS-360CB-40000

A healthier alternative to Generators

Su-Kam DSP Sine Wave Solar Inverter is suitable for widest range of applications in industrial, large commercial having 3 phase supply. The design criterion is to produce a balanced pure sine wave output with optimal efficiency. A unique high start-up power coupled with built-in transformer makes 3 phase inverter highly reliable and capable for wide applications

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Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

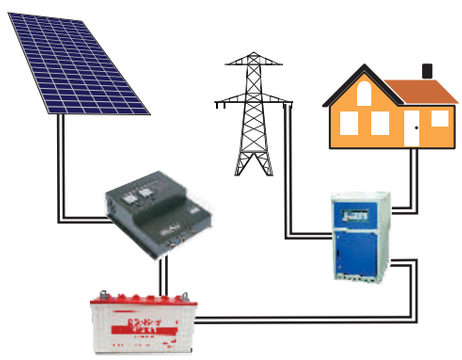
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

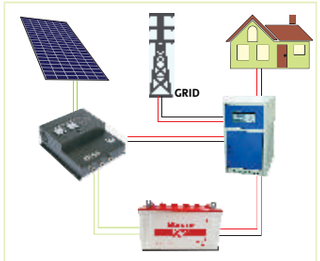
	A	B	C
TV 21"	-	15	10
Room Cooler	-	10	10
Tube light	130	50	35
FAN	130	50	35
CFL	130	50	35
AC (1.5 T)	-	-	4

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	40KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3.5Sec
Max. Inverter to change over time	≤ 3.5Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter mode at 100% Load	≥92%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion at linear load	<5 %
Crest Factor	3:01
Full load output Power	32KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	600mm x 780mm x1000 mm
Weight (Kg) Without Packing (approx.)	330Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

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Solar Inverter

3phase In - 3phase out

LCD MESSAGES

Range - 50KVA/360V

Product Code: SLR-SI-SS-360CB-50000

A healthier alternative to Generators

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Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

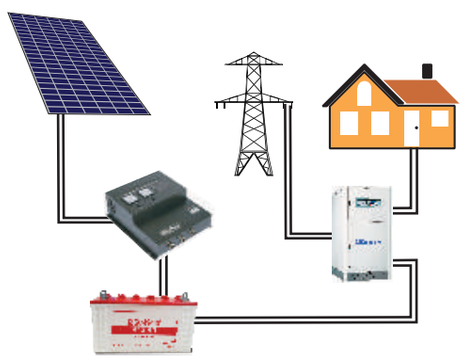
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

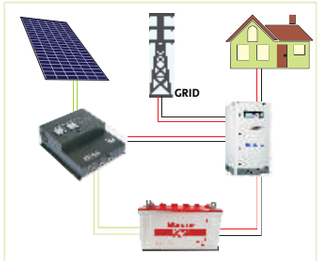
	A	B	C
TV 21"	-	15	10
Room Cooler	-	10	10
Tube light	135	55	40
FAN	135	55	40
CFL	135	55	40
AC (1.5 T)	-	-	5

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	50KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3.5Sec
Max. Inverter to change over time	≤ 3.5Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter mode at 100% Load	≥92%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion at linear load	<5 %
Crest Factor	3:01
Full load output Power	40KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	755mm x 835mm x 1460mm
Weight (Kg) Without Packing (approx.)	190Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

A high capacity inverter can now be converted into a solar high capacity system. This can be achieved by connecting a solar charge controller to a high capacity inverter which is subjected to some changes in its system configuration that allows first preference to charging by solar power.

The combination of the high capacity inverter (after some changes in its system configuration) and the solar charge controller, now utilizes both solar and grid for charging with the first preference given to solar. It also controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode. This helps in utilizing the solar power generated optimally. When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

Solar Inverter

3phase In - 3phase out

LCD MESSAGES

Range - 65KVA/360V

Product Code: SLR-SI-SS-360CB-65000

A healthier alternative to Generators

Su-Kam DSP Sine Wave Solar Inverter is suitable for widest range of applications in industrial, large commercial having 3 phase supply. The design criterion is to produce a balanced pure sine wave output with optimal efficiency. A unique high start-up power coupled with built-in transformer makes 3 phase inverter highly reliable and capable for wide applications

Su-Kam's DSP Solar Sine Wave Inverter supplies pure power, which is actually purer than even the power supplied by the grid, and is 100% safe to run the most sophisticated, expensive and sensitive office equipment, silently. It has already established itself as a most reliable option to Generators at banks/ATM's, hospitals, petrol pumps and shopping malls to name a few.

Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

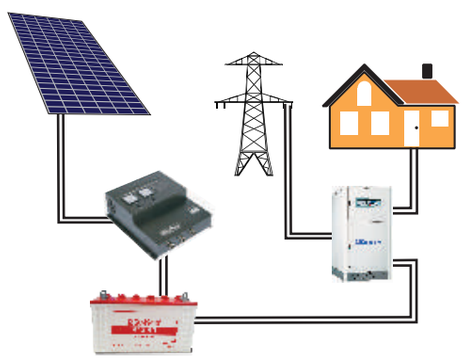
Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
- Restaurants & Hotels
- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
- Clubs, Pubs & Discotheques
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

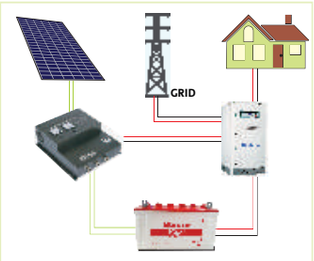
	A	B	C
TV 21"	-	20	10
Room Cooler	-	10	10
Tube light	140	55	45
FAN	140	55	45
CFL	140	55	45
AC (1.5 T)	-	-	6

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	65KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3.5Sec
Max. Inverter to change over time	≤ 3.5Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter mode at 100% Load	≥92%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion at linear load	<5 %
Crest Factor	3:01
Full load output Power	52KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	755mm x 835mm x 1460mm
Weight (Kg) Without Packing (approx.)	240Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

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Solar Inverter

3phase In - 3phase out

LCD MESSAGES

Range - 80KVA/360V

Product Code: SLR-SI-SS-360CB-80000

A healthier alternative to Generators

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Principle : Su-Kam solar Inverter is an important building block of a solar system. The inverter will efficiently and eloquently convert DC from batteries into AC format for normal usage for 3-phase output application.

Product Features

- Less Switch-over time
- Ease of Operation
- Low Running Cost
- Easy to Install
- High Efficiency and Reliability
- Advanced Communication
- Advance Battery Care System
- Su-Kam's Soft Start Technology
- Cold Start
- Generator compatible
- Solar Compatible
- In-built TDR for compressor based application e.g. AC

Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

Displays

- Multifunction LCD display
- Multiple selection Switches

Applications

- Banks / ATM
- BPOs / Call Centers
- Data centers
- Deep freezers
- Elevators & Escalators
- Hospitals
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- Industrial Drives & Motors
- Laboratories
- Petrol Pumps
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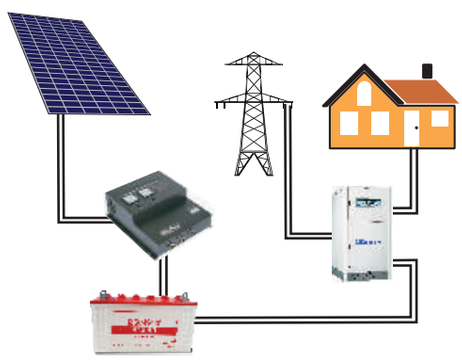
- Schools / Educational Institutions
- Shopping malls / Super Markets
- Telecom Towers
- Textile industry.....and many more

INSTALLATION DIAGRAM



LOAD CHART

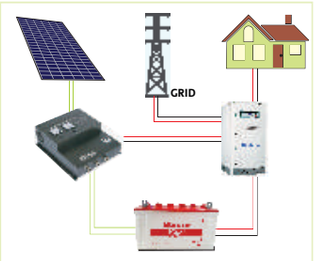
	A	B	C
TV 21"	-	20	10
Room Cooler	-	15	10
Tube light	150	60	50
FAN	150	60	50
CFL	150	60	50
AC (1.5 T)	-	-	8

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	80KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3.5Sec
Max. Inverter to change over time	≤ 3.5Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter mode at 100% Load	≥92%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion at linear load	<5 %
Crest Factor	3:01
Full load output Power	64KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	800mm x 1035mm x 1560mm
Weight (Kg) Without Packing (approx.)	285Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

Specifications are subject to change without prior notice.



Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

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Solar Inverter

3phase In - 3phase out

LCD MESSAGES

Range - 100KVA/360V

Product Code: SLR-SI-SS-360CB-100KV

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- Advance Battery Care System
- Su-Kam's Soft Start Technology
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Electronic Protection Updates

- Auto Self-Testing System
- Overload Short Circuit Protection

Operations

- Works on Solar -> Battery -> Grid and Solar -> Grid -> Battery

Displays

- Multifunction LCD display
- Multiple selection Switches

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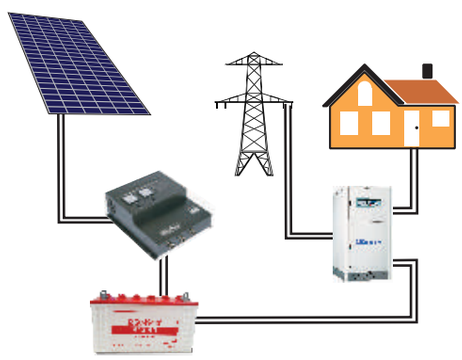
INSTALLATION DIAGRAM



LOAD CHART

	A	B	C
TV 21"	-	25	15
Room Cooler	-	20	15
Tube light	160	70	60
FAN	160	70	60
CFL	160	70	60
AC (1.5 T)	-	-	10

Indicative values only, actual calculation depends on manufacturer's specification

TECHNICAL SPECIFICATIONS

Rating	100KVA
INPUT PARAMETERS	
Input AC Voltage Range	160V-280V± 10V (P-N) , 280V - 480V±10V (P-P)
Input Voltage Low Cut	160±10V (P-N), 280V±10V (P-P)
Input Voltage Low Cut Recovery	170VAC ± 10V (P-N) , 290V± 10V (Ph-Ph)
Input Voltage High Cut	280V±10V (P-N) , 480V± 10V (P-P)
Input Voltage High Cut Recovery	270VAC ± 10V (P-N) , 470V ± 10V (P-P)
Input Frequency Range	45 to 55 Hz.
Charging Current	3A-20A± 10%
Max. Mains to Inverter change over time	≤ 3.5Sec
Max. Inverter to change over time	≤ 3.5Sec
OUTPUT PARAMETERS	
Voltage Regulation	230V / 240V± 10% (P-N), 400V / 415V± 10% (P-P)
Frequency regulation	50Hz±0.1Hz
Peak Efficiency at inverter mode at 100% Load	≥92%
Output Waveform	Pure Sine Wave
Total Harmonic Distortion at linear load	<5 %
Crest Factor	3:01
Full load output Power	80KW
Over Load Handling capacity	≥110% , <150% FOR 5 Minutes to 16 sec.
	≥150% , < 200% FOR 15 Sec. to 5 sec.
	≥ 200%, < 300% FOR 4 Sec. to 2 sec.
	≥ 300% FOR 1 Seconds
Short Circuit Protection	O.K
BATTERY PARAMETERS	
Nominal DC Voltage	360VDC
DC Voltage Low cut	330±2V
DC Voltage Low Warning	335±2V
DC Boost Voltage*	408±2V
DC Voltage high Cut	450V±2V
Dimensions (In mm) W X D X H	800mm x 1035mm x 1560mm
Weight (Kg) Without Packing (approx.)	330Kg
Operating temperature	0°C to 45°C
Relative Humidity	0 to 95% - Non condensing
Communication Interface	RS 232
Acoustic Noise (at one meter)	≤65db
Storage Temperature	0°C to 50°C
Display	20 X 4 Line LCD

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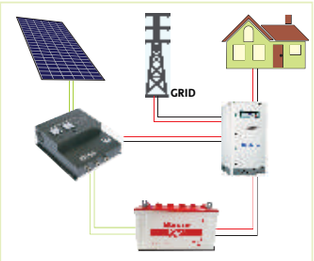

Panel Range: 5000Wp. maximum, Battery 12Vx4

Solar Conversion Kit

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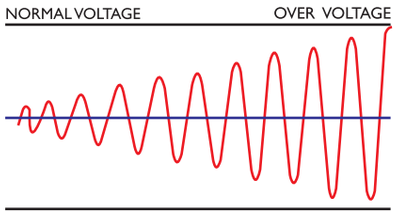


Soft Start Technology

Su-Kam DSP Sine wave Inverter – Colossal Series incorporates Soft Start Technology, which does not allow high startup currents from large inductive loads to shut down the inverter. Soft Start improves inverter operation. Major Soft Start features are:
Gradual voltage ramp-up during inverter startup. This eliminates failed cold starts under load. Output that momentarily dips in voltage and quickly recovers to allow large motorized loads to start. This eliminates almost all shutdowns from momentary overloads.

SMD Technology (Surface Mount Device)

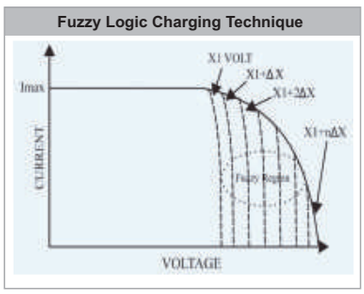
The PCB card is based on Surface Mount Device Technology and reduces human error while manufacturing. Systems based on this SMD technology are more efficient than other conventional systems.

Power Manager (Multiple User Local Monitoring Software)

The Su-Kam DSP Sine Wave Inverter – Colossal Series have an RS-232 Interface for the Power Manager. This user-friendly Communication Software controls and monitors inverter performance and programs inverter commands. An easy- to- use software, it is based on the RS 232 world standard for interfacing Digital Signal Processor with computers. The Power Manager allows you to programme all the commands to be performed by it automatically. This software is very useful for communication systems including Satellite Systems, Air Traffic Control Systems, Internet Nodes, Bank ATM and any other application requiring maximum reliability and availability of high quality power such as computer labs, offices, biomedical instruments, telecommunication systems and industrial establishments. It ensures maximum safety for high-risk applications. Once the inverter is installed, the user need not worry about interruption, low battery level or any other damage, which would have occurred otherwise.

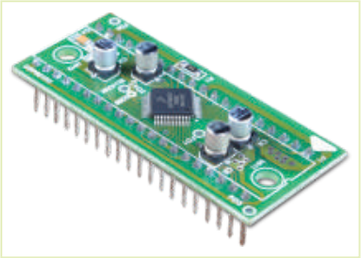
Powerdoc

(Web Based Remote Monitoring and Management Software)
Su-Kam has developed a web-based application for real-time management of its DSP Sine Wave Inverter without using the SNMP hardware. Su-Kam's Colossal Series Inverters, installed anywhere in the world, can now be centrally monitored and controlled by the user(s). This unique and fully validated software solution allows various parameters of the systems to be checked, including load and status of each system.



Fuzzy Logic controlled patented charging Technology

Su-Kam's advanced Fuzzy Logic Controlled charging technology senses the requirement of the battery and controls the charging process accordingly. Battery life is related to the depth of discharge. The more capacity used per cycle the shorter the life of the battery. Conventional method of battery management, which deal with regulating the charging, protection and monitoring of the battery are inefficient for two reasons. First they do not adapt to the battery in question and second, they require the battery to be "off-line" for the duration of the measurements of the battery parameters.

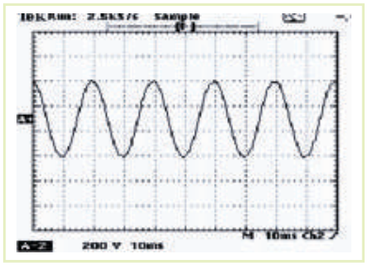


Su-Kam's proprietary solar hybrid software (SGB/SBG technology) is a invention from the Su-Kam R&D team that shall enable the consumer to utilize the power of solar energy to meet his electricity needs. This unique algorithm derives maximum power from solar.

The solar hybrid software (SGB/SBG technology)is the first of its kind software developed in the world that shall enable the customer to derive maximum benefit to meet his power needs from the abundant solar energy available.

The solar hybrid software functions according to its defined intelligent algorithm which controls the solar, battery and grid combination and varies the functions of its different components so that maximum power is always derived from solar. If the solar energy is not sufficient to drive the load or charge the battery, then the intelligent algorithm takes the energy from the grid and supplies it to the load.

The intelligent algorithm is improving the system's efficiency as well as the other components' scanning power (solar panel and charger). With this intelligent software, the consumer is able to derive most of his power needs through solar energy while minimizing his dependence on the grid resulting in savings in the electricity bills. The algorithm has also been designed keeping in mind the availability of the sun and its maximum usable intensity in the daytime.



Pure Sine Wave Technology

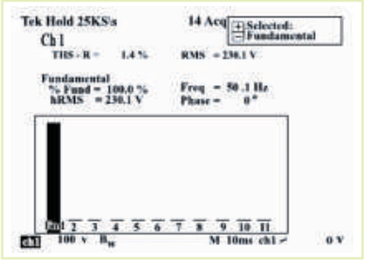
Su-Kam's Sine Wave HUPS have advance PWM switching techniques and filters which results in the reduction of harmonic distortion to <3% .

Su-Kam Sine Wave technology innovations enable higher efficiency in battery charging leading to saving in electricity consumption.

Su-Kam Sine Wave HUPS provides pure energy to enhance life of appliances & smooth in operations.

LHD - Low Harmonic Distortion Technology

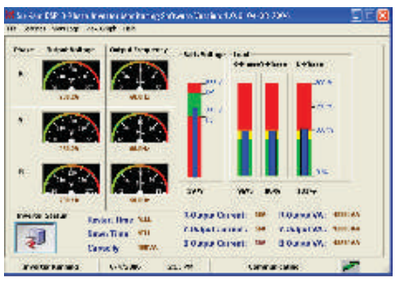
Harmonic distortion control at load bus is of vital importance to both distribution and customers. For the distribution, a power factor improvement reduces transmission system losses and increases the portion of generation capacity available for productive uses. For customers, by maintaining good power factor there is huge money saving on electricity bills.

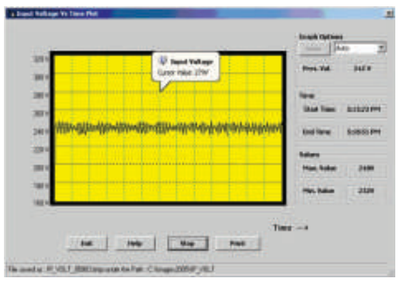


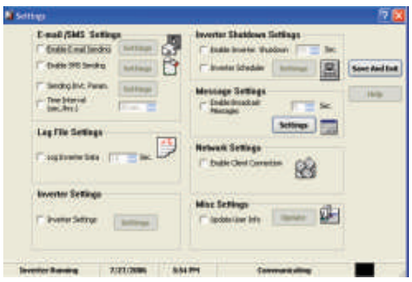
Transformer Technology

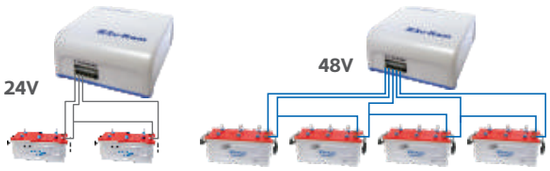
Su-Kam's new transformer design based on S2 technology, is more efficient and reliable for power back-up systems. S2 transformer technology takes minimum power from the battery and gives maximum output in load which is why user takes maximum back-up from the HUPS.

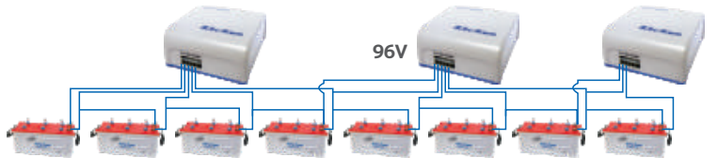
Monitoring Software





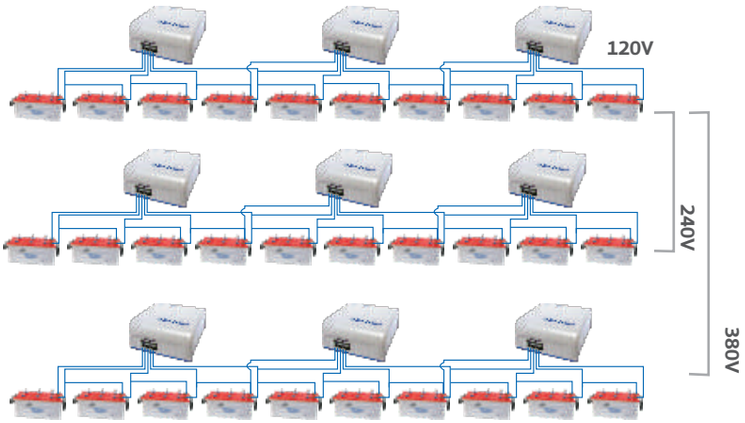


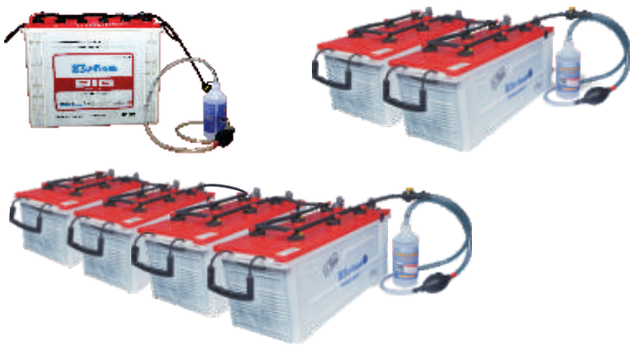




Battery Equalizer

Battery equalizer is a unique product that equalizes two or more batteries in a battery bank connected in series. Battery equalizer enhances the battery life by preventing under charge and over charge of the batteries. Battery equalizer helps you save money by delaying the replacement of your batteries. As you get optimum life from your batteries.





Water Topping Kit

- Single Point multi cell water topping
- Safely fill batteries without removing vent covers.
- Extended battery life & increased performance
- No chances of acid spillage on floors
- Save Battery from under topping and over topping

Trolley

- X-tra durable: Made from tough, long lasting PPCP compound material which does not get destroyed ever if there is leakage / spillage from batteries.
- X-tra convenient: In built ribs for smooth in and out movement of battery without getting stuck.
- X-tra ease of movement: Sturdy yet smooth wheels enabling extra ease of movement while carrying the bulky battery.
- X-tra space saving: Stacks up with Inverter / UPS neatly in a corner, thus taking less space. Aesthetically designed to match
- X-tra safe: Provides good ventilation for battery.

CONVERSION KIT-SOLARCON

With an ever increasing demand of energy and the shortage in the generation the prices of the conventional energy are increasing day by day, the day is not far away when the price of renewable energy would be at par with the conventional energy. With a focus on sustainable energy the government is giving subsidies to popularize the renewable energy and to reduce the burden on the conventional resources.

Present Situation

There is a big market of small inverters in India and over 4 million inverters are sold every year, so there is a big group of prospective customers having inverters/HUPS in their homes and would like to take benefit of renewable energy such as solar energy.

The regular solutions available in the market provide a separate charge controller to charge the existing inverter battery, the inverter also charges the battery simultaneously when mains supply is present. This kind of solution does not provide optimum performance for charging the battery. When mains is present it would charge the battery at a constant current and the solar energy would not be utilized fully when mains supply has already charged the battery to full state.

The solution

Solarcon hybrid solar charge controller solution overcomes the challenges in the existing solutions. It can be connected with any existing HUPS/inverter and convert it into a solar powered system. it controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode now the power is supplied from battery and solar. This helps in utilizing the solar power generated optimally.

When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place

Features

- Solarcon Convert's the customer's existing inverter/hups battery inverter into solar energy powered intelligent system. The system functions according to the user setting for the battery and mains usage for running the load.
- The system charges the battery with three stages boost, absorption and float for optimum charging. The battery is charged with maximum available charging current in the boost mode, once the battery is charged to the maximum level, the charging state is charged to absorption in this the battery maximum charge level is maintained and the charging current is controlled, after a predefined time in this state the charging voltage level is reduced to the float level and maintained.
- The system protects the overcharging of battery in high ambient temperature; this enhances the life of the connected battery significantly. Provides efficient charging for the battery with temperature compensation at higher ambient temperature.
- Solarcon can charge and adjust the charging profile according to the various types of battery such as lead acid Tubular etc. it helps in providing the optimum performance of battery
- The Solarcon can be configured to suit the requirements of different customers, the user can select the amount of usage of his battery capacity before he can use mains to charge his battery. These settings are field adjustable and that helps in creating best fit design for the customer.
- One of the unique features of Solarcon is that it gives you the reading of Rupees saved cumulatively by utilizing the solar power. This helps user to judge the performance of his system. The system continuously monitors the solar power generated and an inbuilt calculator derives the amount of savings in Rupees.
- Solarcon also provides the LCD for display of data and information to user about the system status and savings generated.

Application

- Upgrading the existing 12V and 24V Home UPS/inverter to solar powered system
- Household Application

CONVERSION KIT-SOLARCON

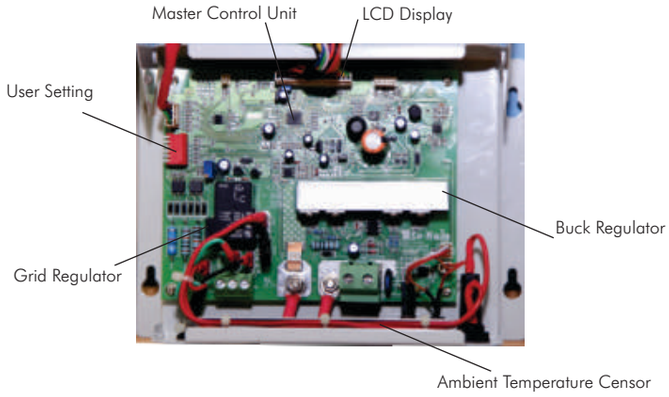
PWM Based

12V/16A , 24V/16A

MPPT Range

12V/40A, 24V/20A, 24V/40A, 48V/20A, 48V/40A

Conversion Kit-SolarCon



Product Code: SCC-SP-OT-01200-00016

PWM Range - 12V/16A

Su-Kam's SolarCon hybrid Solar Charge Controller is an intelligent device with inbuilt intelligent technology for utilization of solar power optimally.

Working Principle

Solarcon hybrid Solar Charge Controller solution overcomes the challenges in the existing solutions. It can be connected with any existing Home UPS/Inverter and convert it into a solar powered system. It controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode now the power is supplied from battery and solar. This helps in utilizing the solar power generated optimally.
When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

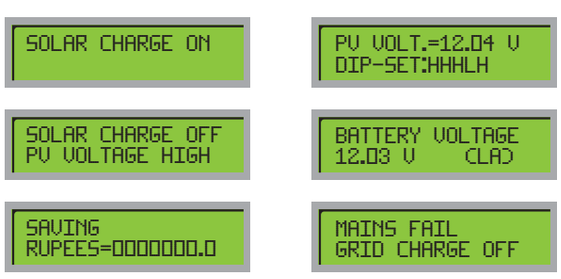
Features

- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Widely used, automatically recognizes day/night
- Graphics dot-matrix LCD screen & HMI (human-machine interface) with 4 buttons, integrated menu display & operation
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options -SMF/TT/LA batteries
- Adopt temperature compensation, correction algorithm for charging and discharging parameters automatically and improves battery life
- Reverse protection: any combination of solar module and battery

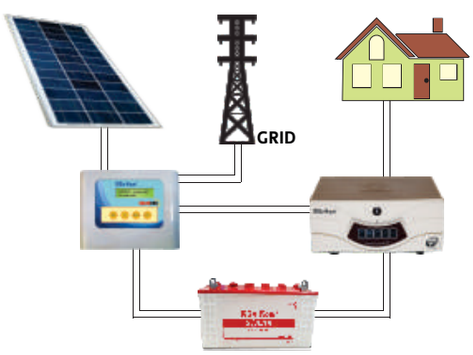
Electronic Protection Updates

- Short Circuit through Fuse
- Reverse Battery Mode with LED Indication
- Reverse PV array with LED Indication
- Surges/ Spikes protection with MOV
- No mechanical switch, uses MOSFET as an electronic switch
- Prevent overheating, overcharging, over discharging, over load, and short circuit

LCD DISPLAY DIAGRAM



INSTALLATION DIAGRAM



Conversion Kit-SolarCon

Displays (Single Line)

- Backup Mode and Mains Mode
- Battery Voltage
- Solar Status
- Rupees Saving
- Mains Low & High
- Battery Low & High

Operations/ Options

- Input range: 90V-300V±20V
- Automatic Changeover Solar/Grid Battery
- Short circuit through Fuse

Applications

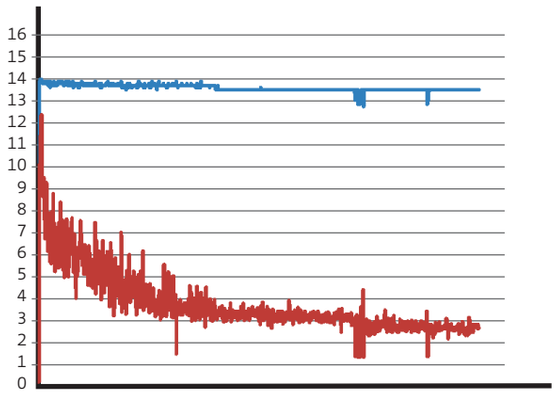
- Any Existing Inverter/ HUPS
- New Inverter/HUPS

Convenience

- Installation with ease
- Electricity bill reduction
- Compatible with any HUPS/Inverter

Existing System		System to be installed	
Existing HUPS System	Existing Battery	PV Panel	Solar Con
250 VA	50Ah TT	80W-150W	12V/16A
400/450 VA	100Ah TT	80W-150W	12V/16A
650 VA	135Ah-200Ah TT	100W-300W	12V/16A
850 VA	135Ah-200Ah TT	100W-300W	12V/16A
850 VA	135Ah-200Ah LA	100W-300W	12V/16A
1000 VA	135Ah-200Ah LA	100W plus	12V/16A
1050 VA	135Ah-200Ah LA	100W plus	12V/16A

The battery being charged with PV current=16 A current with PV voltage =16 V. Mains not available



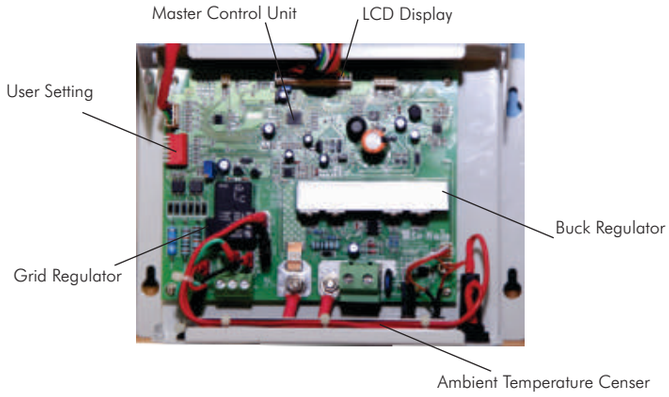
LOAD CHART

	250 VA	450 VA	650 VA	850 VA	1000 VA	1050 VA
Television	1	1	1	1	1	1
Tublight	1	1	2	3	3	3
Fans	-	1	3	3	3	3
CFL	2	5	2	4	6	7

TECHNICAL SPECIFICATIONS

Nominal Battery Voltage	12 V (Single Battery)
Recommended Home UPS / Inverter Range	Upto 1000VA/12V
Minimum Recommended Battery	100Ah - 200Ah
Maximum PV panel rating	36 cell Polycrystalline/monocrystalline
	300 Wp
	Imp : ≤ 16A
Float voltage	13.7 V ± 2% at charger's o/p terminal
Equalization Voltage	Bulk Voltage + 1V
Automatic Temperature compensation in	Provided
Auto Restart after PV High Current	3.5 minutes. ± 20 sec
Input Range	90V-300V ± 20V
Automatic Changeover Solar / Grid / Battery	Grid power connects to inverter when battery voltage 80% / 60% / 40% / 20% per battery (As per setting of selection Switch) if grid is within the specified range.
Short Ckt. (Mains Mode)	Yes (through Fuse)
Reverse Battery	Yes with LED indication
Reverse PV array	Yes with LED indication
Surge/ spike protection	Yes through MOV
Backup Mode & Mains Mode	Battery Voltage / Solar Status / Rupees Saving / Mains Low / Mains High / Battery Low / Battery High
Operating Temperature Range	0°C to + 55°C
Dimensions (WxDxH) in mm	215mm X 156mm X 68mm
Weight (±) 100 gm.	1.3 Kg

Conversion Kit-SolarCon



PWM Range - 24V/16A

Su-Kam's SolarCon hybrid Solar Charge Controller is an intelligent device with inbuilt intelligent technology for utilization of solar power optimally.

Working Principle

Solarcon hybrid Solar Charge Controller solution overcomes the challenges in the existing solutions. It can be connected with any existing Home UPS/Inverter and convert it into a solar powered system. It controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode now the power is supplied from battery and solar. This helps in utilizing the solar power generated optimally.
When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

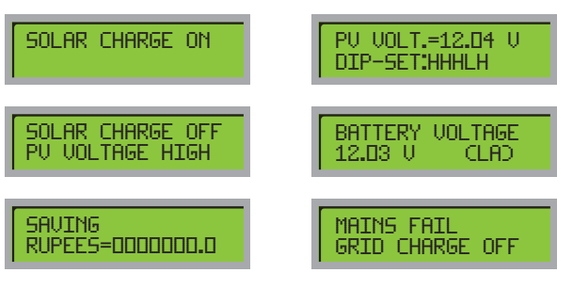
Features

- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Widely used, automatically recognizes day/night
- Graphics dot-matrix LCD screen & HMI (human-machine interface) with 4 buttons, integrated menu display & operation
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options -SMF/TT/LA batteries
- Adopt temperature compensation, correction algorithm for charging and discharging parameters automatically and improves battery life
- Reverse protection: any combination of solar module and battery

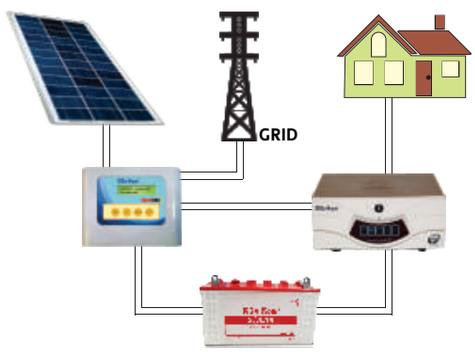
Electronic Protection Updates

- Short Circuit through Fuse
- Reverse Battery Mode with LED Indication
- Reverse PV array with LED Indication
- Surges/ Spikes protection with MOV
- No mechanical switch, uses MOSFET as an electronic switch
- Prevent overheating, overcharging, over discharging, over load, and short circuit

LCD DISPLAY DIAGRAM



INSTALLATION DIAGRAM



Conversion Kit-SolarCon

Displays (Single Line)

- Backup Mode and Mains Mode
- Battery Voltage
- Solar Status
- Rupees Saving
- Mains Low & High
- Battery Low & High

Operations/ Options

- Input range: 90V-300V±20V
- Automatic Changeover Solar/Grid Battery
- Short circuit through Fuse

Applications

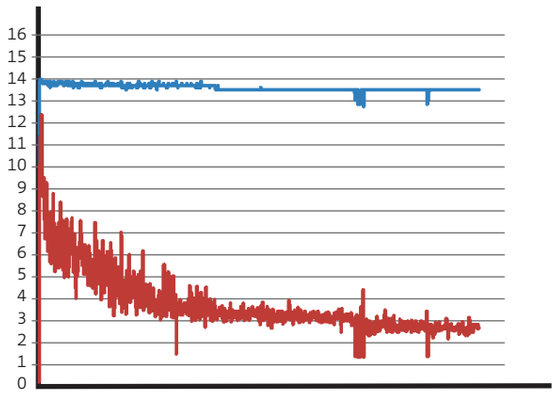
- Any Existing Inverter/ HUPS
- New Inverter/HUPS

Convenience

- Installation with ease
- Electricity bill reduction
- Compatible with any HUPS/Inverter

Existing System		System to be installed	
Existing HUPS System	Existing Battery	PV Panel	Solar Con
1400 VA	135Ah-200Ah LA	250W/24V or 100W/12Vx2	12V-24V/16A
1400 VA	135Ah-200Ah TT	250W/24V or 100W/12Vx2	12V-24V/16A
1500 VA	135Ah-200Ah LA	250W/24V or 100W/12Vx2	12V-24V/16A
1500 VA	135Ah-200Ah TT	250W/24V or 100W/12Vx2	12V-24V/16A
2000 VA	135Ah-200Ah LA	250W/24V or 100W/12Vx2	12V-24V/16A
2000 VA	135Ah-200Ah TT	250W/24V or 100W/12Vx2	12V-24V/16A

The battery being charged with PV current=16 A current with PV voltage =16 V. Mains not available



LOAD CHART

	1400 VA	1500 VA	2000 VA
Printer	-	1	-
TV (19"-21")	1	-	1
Tublight (40W)	6	4	10
Fans (48mm)	6	4	10
CFL (11W)	9	-	16

TECHNICAL SPECIFICATIONS

Nominal Battery Voltage	24 V (Double Battery)
Recommended Home UPS / Inverter Range	Upto 2000VA/12V
Minimum Recommended Battery	100Ah - 200Ah
Maximum PV panel rating	60/72 cell Polycrystalline/monocrystalline
	500 Wp
	Imp : ≤ 16A
Float voltage	27.2 V ± 2% at charger's o/p terminal
Equalization Voltage	Bulk Voltage + 2V
Automatic Temperature compensation in	Provided
Auto Restart after PV High Current	3.5 minutes. ± 20 sec
Input Range	90V-300V ± 20V
Automatic Changeover Solar / Grid / Battery	Grid power connects to inverter when battery voltage 80% / 60% / 40% / 20% per battery (As per setting of selection Switch) if grid is within the specified range.
Short Ckt. (Mains Mode)	Yes (through Fuse)
Reverse Battery	Yes with LED indication
Reverse PV array	Yes with LED indication
Surge/ spike protection	Yes through MOV
Backup Mode & Mains Mode	Battery Voltage / Solar Status / Rupees Saving / Mains Low / Mains High / Battery Low / Battery High
Operating Temperature Range	0°C to + 55°C
Dimensions (WxDxH) in mm	215mm X 156mm X 68mm
Weight (±) 100 gm.	1.3 Kg

Product Code: SCC-SC-OT-02400-00020

MPPT Range - 12V/40 A, 24V/ 20A,24V/40 A,48V/20A,48V/40A

Su-Kam's SolarCon hybrid Solar Charge Controller is an intelligent device with inbuilt intelligent technology for utilization of solar power optimally.

Working Principle

Solarcon hybrid Solar Charge Controller solution overcomes the challenges in the existing solutions. It can be connected with any existing Home UPS/Inverter and convert it into a solar powered system. It controls the mains supply to the inverter so that when the battery is fully charged and still solar power is available to charge the battery, it automatically disconnects the mains from the inverter and the inverter starts working in backup mode now the power is supplied from battery and solar. This helps in utilizing the solar power generated optimally.
When the battery is discharged below the pre-defined user settable limit and mains is present, it is connected to the inverter so that the load is bypassed to mains and the battery charging can take place.

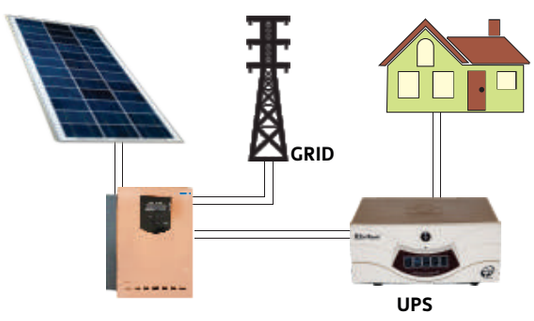
Features

- Compatible with any UPS/Inverter make and battery
- Fully Automatic changeover from Solar <->Mains/Battery
- PV Voltage, PV current, Source of power displayed on the device
- Works with 12V/24V/36/48V battery bank systems
- Charging current from Solar: 10/20/30/40/50/60Amps programmable
- Order of source priority Solar -> Solar + Battery->Battery (up to threshold) ->Mains
- Option of upgradation to higher capacity UPS/Inverters using the same SCK at later stage
- Wall mountable Sleek design

Electronic Protection Updates

- Short Circuit through Fuse
- Reverse Battery Mode with LED Indication
- Reverse PV array with LED Indication
- Surges/ Spikes protection with MOV
- No mechanical switch, uses MOSFET as an electronic switch
- Prevent overheating, overcharging, over discharging, over load, and short circuit

INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Inputs			
MPP Range/ Operating voltage	12V Battery:	24V Battery:	48V Battery:
	17V ~140VDC	34V- 140V DC	65V -140V DC
Max DC Voltage	150V		
Max PV power	500W,1000W,1500W,2000W,3000W		
DC Start Voltage	20V		
Output			
Nominal Battery Voltage	12V,24V,48V DC (Factory set)		
Battery Type	Sealed Lead Acid, Vented, Gel, NiCd, AGM		
Maximum Charging Current	12V DC -40A	24V DC–20A,40A	48V DC-20A,40A
Charging Method	Bulk, Absorption, Floating		
Protections			
Polarity Reversal Protection	Integrated		
Overload Protection	Integrated		
Overcharge Protection	Integrated		
Short Circuit Protection	Integrated		
Display			
LCD	Backlight LCD with parameters and data display		
LED	Standby, Power and Alarm indicators		
General			
Dimension	305X241X106 mm		
Weight	3 Kgs		
Ingress Protection	Ip21		

ORIGINAL

No. 5769

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 220865
Date 30TH JAN. 2009
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-03 in respect of the application of such design to "SOLAR CHARGE CONTROLLER" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI:-110 046, INDIA. AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

Controller General of Patents, Designs and Trade Marks

*The reciprocity date (if any) which has been allowed and the name of the country.
Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
This Certificate is not for use in legal proceedings or for obtaining registration abroad.

DR. I. BANERJEE,
L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
3RD SEP. 2009.

Patent: Solar Charge Controller
Design No: 220865

ORIGINAL

No. 9291

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217397
Date 28TH JULY 2008
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-03 in respect of the application of such design to "SOLAR CHARGE CONTROLLER" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI:-110 046, INDIA. AN INDIAN COMPANY.

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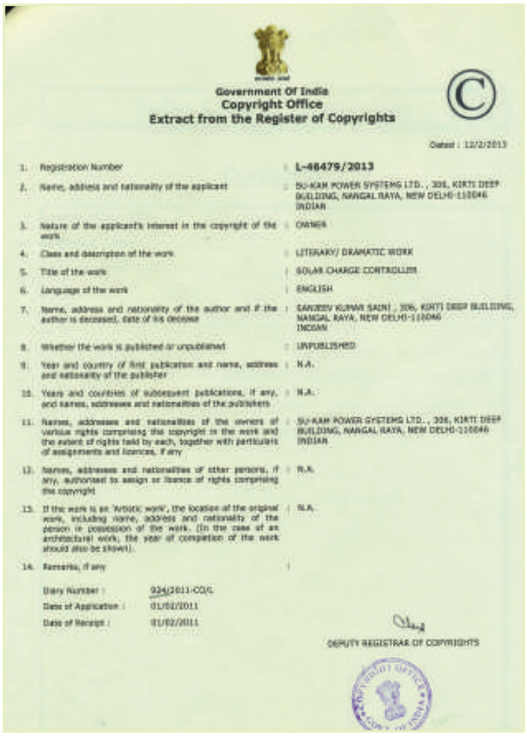
KOLKATA-700010.

Date of issue
30TH APRIL 2009

Patent: Solar Charge Controller
Design No: 217397



Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 12/2/2013

1.	Registration Number	: L-46479/2013
2.	Name, address and nationality of the applicant	: SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3.	Nature of the applicant's interest in the copyright of the work	: OWNER
4.	Class and description of the work	: LITERARY/ DRAMATIC WORK
5.	Title of the work	: SOLAR CHARGE CONTROLLER
6.	Language of the work	: ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	: SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	: UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	: N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	: N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	: SU-KAM POWER SYSTEMS LTD., 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	: N.A.
13.	If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown).	: N.A.
14.	Remarks, if any	:

Diary Number : 924/2011-CO/L
Date of Application : 01/02/2011
Date of Receipt : 01/02/2011

DEPUTY REGISTRAR OF COPYRIGHTS

Certificate: PCB Layout of
Solar Charge Controller (10A)


ORIGINAL

No. 5769

GOVERNMENT OF INDIA

THE PATENT OFFICE

CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 220865
Date 20TH JAN. 2009
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to "SOLAR CHARGE CONTROLLER" in the name of

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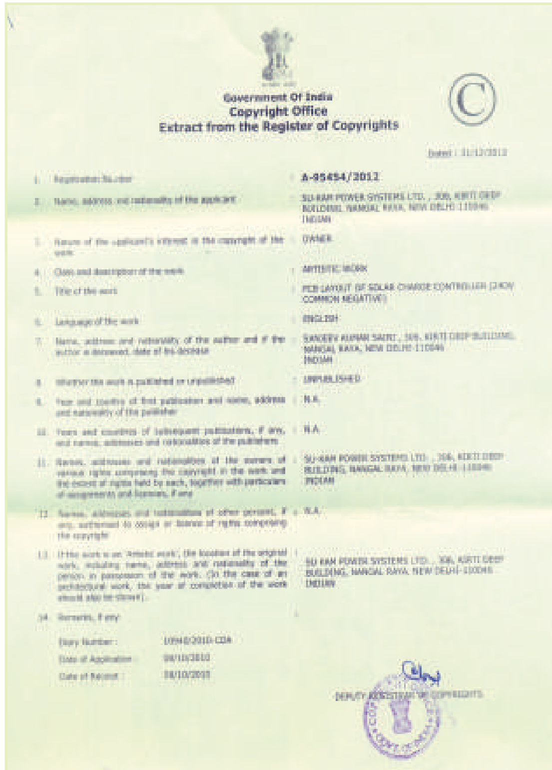
Date of issue
3RD SEP. 2009.

Patent: Solar Charge Controller
Design No: 220865


Government Of India
Copyright Office
Extract from the Register of Copyrights

1. Registration Number : A-95454/2012
2. Name, address and nationality of the applicant : SU-KAM POWER SYSTEMS LTD., 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3. Nature of the applicant's interest in the copyright of the work : OWNER
4. Class and description of the work : ARTISTIC WORK
5. Title of the work : PCB LAYOUT OF SOLAR CHARGE CONTROLLER (240V COMMON NEGATIVE)
6. Language of the work : ENGLISH
7. Name, address and nationality of the author and if the author is deceased, date of his decease : SANJEEV KUMAR SAINI, 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8. Whether the work is published or unpublished : UNPUBLISHED
9. Year and country of first publication and name, address and nationality of the publisher : N.A.
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers : N.A.
11. Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any : SU-KAM POWER SYSTEMS LTD., 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
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14. Remarks, if any

DEPUTY REGISTRAR OF COPYRIGHTS

Certificate: PCB Layout of Solar Charge Controller
(240V common negative)


ORIGINAL

No. 9291

GOVERNMENT OF INDIA

THE PATENT OFFICE

CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217397
Date 28TH JULY 2008
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-03 in respect of the application of such design to "SOLAR CHARGE CONTROLLER" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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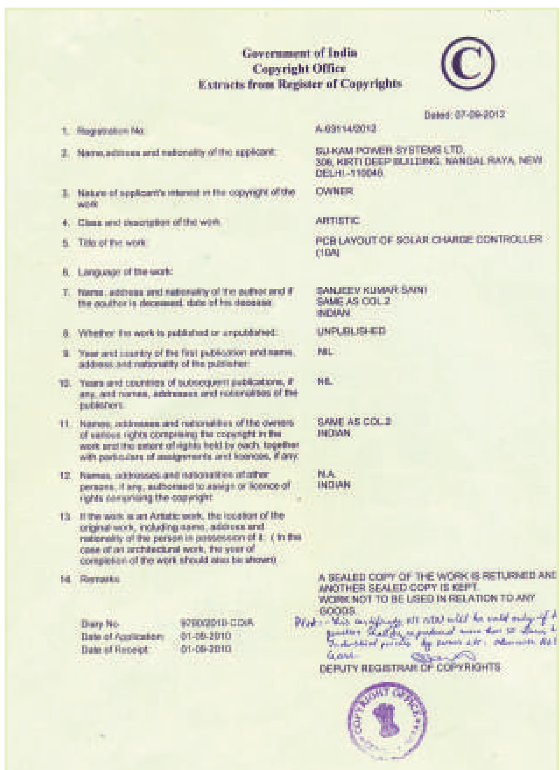
*The reciprocity date (if any) which has been allowed and the name of the country.
Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
This Certificate is not for use in legal proceedings or for obtaining registration abroad.

L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue

Patent Solar Charge Controller
Design No: 217397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Extracts from Register of Copyrights

Dated: 07-09-2012

1. Registration No. : A-93114/2012
2. Name, address and nationality of the applicant : SU-KAM POWER SYSTEMS LTD. 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046
3. Nature of applicant's interest in the copyright of the work : OWNER
4. Class and description of the work : ARTISTIC
5. Title of the work : PCB LAYOUT OF SOLAR CHARGE CONTROLLER (10A)
6. Language of the work :
7. Name, address and nationality of the author and if the author is deceased, date of his decease : SANJEEV KUMAR SAINI SAME AS COL.2 INDIAN
8. Whether the work is published or unpublished : UNPUBLISHED
9. Year and country of the first publication and name, address and nationality of the publisher : NIL
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers : NIL
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Diary No. 9790/2010-CO/A
Date of Application 01-09-2010
Date of Receipt 01-09-2010

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Certificate: PCB Layout of
Solar Charge Controller (10A)

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Copyright Office
Extracts from Register of Copyrights

Dated: 08-09-2012

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3.	Nature of applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	ARTISTIC
5.	Title of the work	PCB LAYOUT OF HOME LIGHTING SOLAR CHARGE CONTROLLER
6.	Language of the work	
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI SAME AS COL 2
8.	Whether the work is published or unpublished	UNPUBLISHED
9.	Year and country of the first publication and name, address and nationality of the publisher	NIL
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Diary No: 9788/2010-CO/A
Date of Application: 01-09-2010
Date of Receipt: 01-09-2010

Note: - [illegible]

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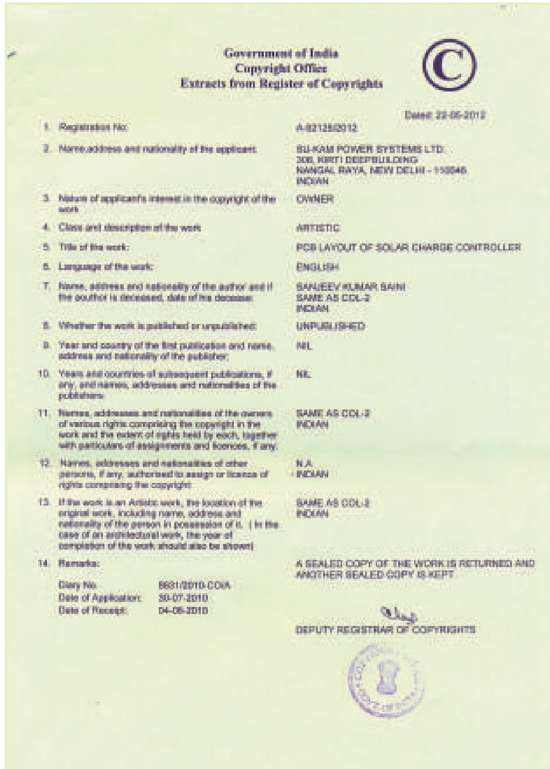
Certificate:PCB layout of
Home Solar Charge Controleer



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Dated: 22-05-2012

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4.	Class and description of the work	ARTISTIC
5.	Title of the work:	PCB LAYOUT OF SOLAR CHARGE CONTROLLER
6.	Language of the work:	ENGLISH
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8.	Whether the work is published or unpublished:	UNPUBLISHED
9.	Year and country of the first publication and name, address and nationality of the publisher:	NIL
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers:	NIL
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any.	SAME AS COL-2 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A. INDIAN
13.	If the work is an Artistic work, the location of the original work, including name, address and nationality of the person in possession of it. (In the case of an architectural work, the year of completion of the work should also be shown)	SAME AS COL-2 INDIAN
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Diary No: 8631/2010-CO/A
Date of Application: 30-07-2010
Date of Receipt: 04-08-2010

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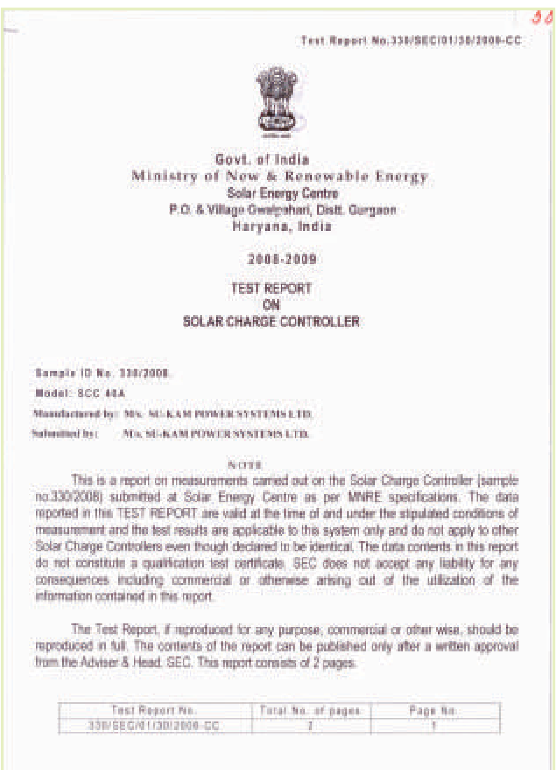
Certificate: PCB layout of Solar Charge Controller



Test Report No.330/SEC/01/30/2008-CC

Govt. of India
Ministry of New & Renewable Energy
Solar Energy Centre
P.O. & Village Gwalpahari, Distt. Gurgaon
Haryana, India

2008-2009

TEST REPORT
ON
SOLAR CHARGE CONTROLLER

Sample ID No. 330/2008
Model: SCC 40A
Manufactured by: M/s. SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s. SU-KAM POWER SYSTEMS LTD.

NOTE

This is a report on measurements carried out on the Solar Charge Controller (sample no.330/2008) submitted at Solar Energy Centre as per MNRE specifications. The data reported in this TEST REPORT are valid at the time of and under the stipulated conditions of measurement and the test results are applicable to this system only and do not apply to other Solar Charge Controllers even though declared to be identical. The data contents in this report do not constitute a qualification test certificate. SEC does not accept any liability for any consequences including commercial or otherwise arising out of the utilization of the information contained in this report.

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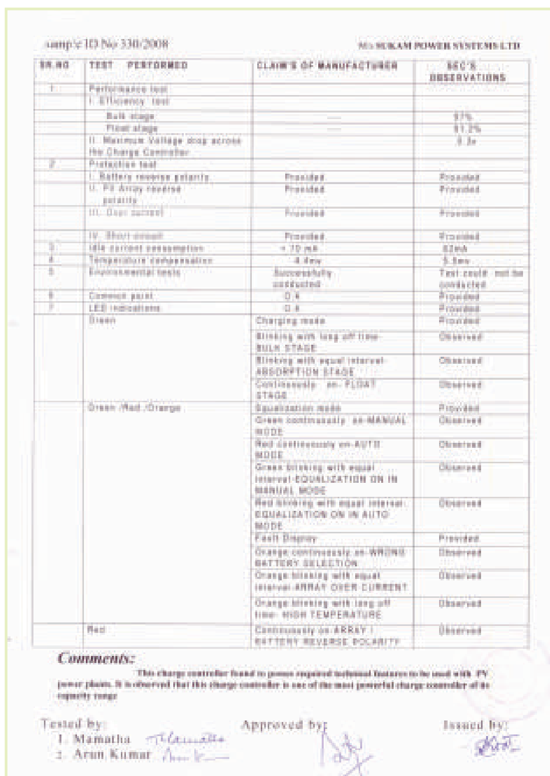
Test Report No.	Total No. of pages	Page No.
330/SEC/01/30/2008-CC	2	1

Test report: Solar Charge Contoller (40A) - page 1



Sample ID No 330/2008 M/s SUKAM POWER SYSTEMS LTD

SR.NO	TEST PERFORMED	CLAIM'S OF MANUFACTURER	SEC'S OBSERVATIONS
1.	Performance test		
	I. Efficiency test		
	Bulk stage	---	97%
	Float stage	---	91.2%
	II. Maximum Voltage drop across the Charge Controller		0.3v
2.	Protection test		
	I. Battery reverse polarity	Provided	Provided
	II. PV Array reverse polarity	Provided	Provided
	III. Over current	Provided	Provided
	IV. Short circuit	Provided	Provided
3.	Idle current consumption	< 10 mA	62mA
4.	Temperature compensation	4 mv	5.5mv
5.	Environmental tests	Successfully conducted	Test could not be conducted
6.	Common point	O.K	Provided
7.	LED indications	O.K	Provided
	Green	Charging mode	Provided
		Blinking with long off time-BULK STAGE	Observed
		Blinking with equal interval-ABSORPTION STAGE	Observed
		Continuously on- FLOAT STAGE	Observed
	Green /Red /Orange	Equalization mode	Provided
		Green continuously on-MANUAL MODE	Observed
		Red continuously on-AUTO MODE	Observed
		Green blinking with equal interval-EQUALIZATION ON IN MANUAL MODE	Observed
		Red blinking with equal interval-EQUALIZATION ON IN AUTO MODE	Observed
		Fault Display	Provided
		Orange continuously on-WRONG BATTERY SELECTION	Observed
		Orange blinking with equal interval-ARRAY OVER CURRENT	Observed
		Orange blinking with long off time- HIGH TEMPERATURE	Observed
	Red	Continuously on-ARRAY / BATTERY REVERSE POLARITY	Observed

Comments:

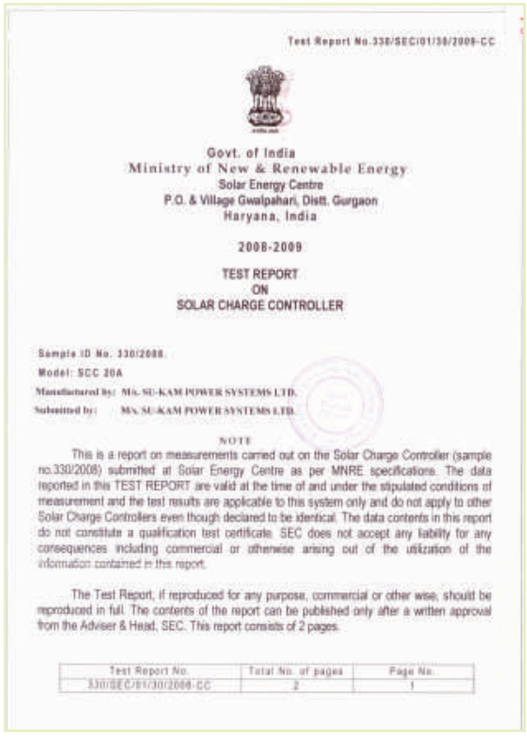
This charge controller found to posses required technical features to be used with PV power plants. It is observed that this charge controller is one of the most powerful charge controller of its capacity range.

Tested by:
1. Mamatha
2. Arun Kumar

Approved by:

Issued by:

Test report: Solar Charge Contoller (40A) - page 2



Test Report No.330/SEC/01/30/2008-CC

Govt. of India
Ministry of New & Renewable Energy
Solar Energy Centre
P.O. & Village Gwalpahari, Distt. Gurgaon
Haryana, India

2008-2009

TEST REPORT
ON
SOLAR CHARGE CONTROLLER

Sample ID No. 330/2008.
Model: SCC 20A
Manufactured by: M/s. SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s SU-KAM POWER SYSTEMS LTD.

NOTE

This is a report on measurements carried out on the Solar Charge Controller (sample no.330/2008) submitted at Solar Energy Centre as per MNRE specifications. The data reported in this TEST REPORT are valid at the time of and under the stipulated conditions of measurement and the test results are applicable to this system only and do not apply to other Solar Charge Controllers even though declared to be identical. The data contents in this report do not constitute a qualification test certificate. SEC does not accept any liability for any consequences including commercial or otherwise arising out of the utilization of the information contained in this report.

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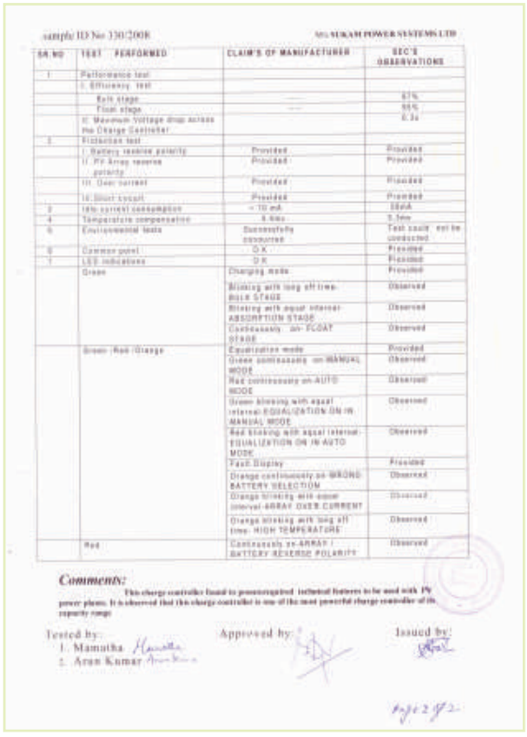
Test Report No.	Total No. of pages	Page No.
330/SEC/01/30/2008-CC	2	1

Test report: solar Charge Controller (20A) - page 1



sample ID No 330/2008 — M/s SUKAM POWER SYSTEMS LTD

SR NO	TEST PERFORMED	CLAIM'S OF MANUFACTURER	SEC'S OBSERVATIONS
1	Performance test		
	I. Efficiency test		
	Bulk stage	----	97%
	Float stage	----	95%
	II. Maximum Voltage drop across the Charge Controller		0.3v
2	Protection test		
	I. Battery reverse polarity	Provided	Provided
	II. PV Array reverse polarity	Provided	Provided
	III. Over current	Provided	Provided
	IV. Short circuit	Provided	Provided
3	Idle current consumption	~ 10 mA	10mA
4	Temperature compensation	5 Mv	5 Mv
5	Environmental tests	Successfully conducted	Test could not be conducted
6	Common point	O.K	Provided
7	LED indications	O.K	Provided
	Green	Charging mode	Provided
		Blinking with long off time- BULK STAGE	Observed
		Blinking with equal interval- ABSORPTION STAGE	Observed
		Continuously on- FLOAT STAGE	Observed
	Green -Red -Orange	Equalization mode	Provided
		Green continuously on MANUAL MODE	Observed
		Red continuously on AUTO MODE	Observed
		Green blinking with equal interval-EQUALIZATION ON IN MANUAL MODE	Observed
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		Fault Display	Provided
		Orange continuously on-WRONG BATTERY SELECTION	Observed
		Orange blinking with equal interval-ARRAY OVER CURRENT	Observed
		Orange blinking with long off time- HIGH TEMPERATURE	Observed
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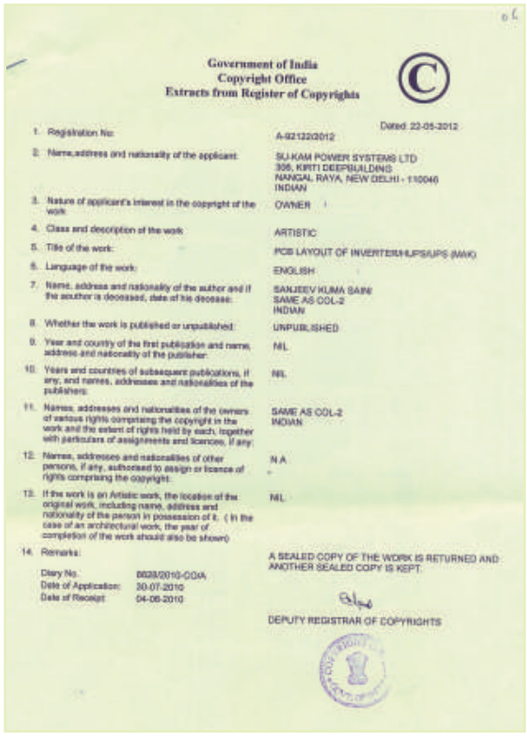
Comments: This charge controller found to possess required technical features to be used with PV power plants. It is observed that this charge controller is one of the most powerful charge controller of its capacity range.

Tested by: 1. Mamatha 2. Arun Kumar — Approved by: — Issued by:

Test report: solar Charge Controller (20A) - page 2



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Dated: 22-05-2012

1.	Registration No:	A-92122/2012
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3.	Nature of applicant's interest in the copyright of the work:	OWNER
4.	Class and description of the work:	ARTISTIC
5.	Title of the work:	PCB LAYOUT OF INVERTER/HUPS/UPS (MAK)
6.	Language of the work:	ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease:	SANJEEV KUMA SAINI SAME AS COL-2 INDIAN
8.	Whether the work is published or unpublished:	UNPUBLISHED
9.	Year and country of the first publication and name, address and nationality of the publisher:	NIL
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers:	NIL
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Date of Application: 30-07-2010
Date of Receipt: 04-08-2010

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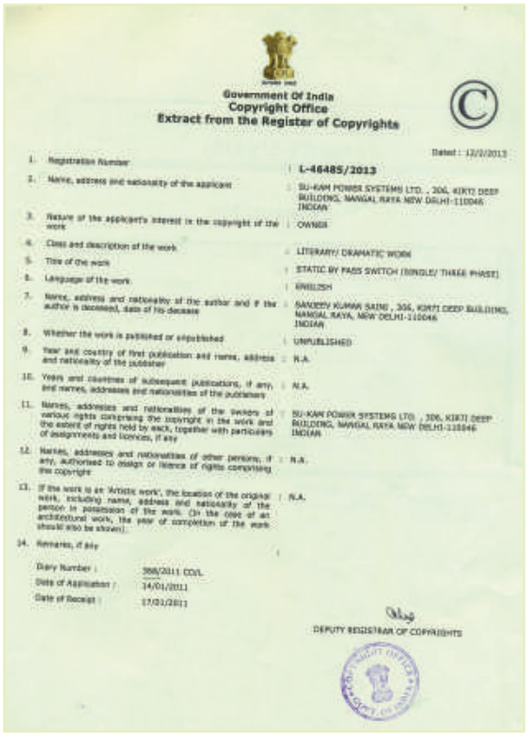
Copyright: PCB layout of Solar Inverter



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5.	Title of the work	: STATIC BY PASS SWITCH (SINGLE/ THREE PHASE)
6.	Language of the work	: ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	: SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	: UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	: N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	: N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	: SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA NEW DELHI-110046 INDIAN
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Date of Receipt : 17/01/2011

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Copyright: Static by pass switch (1p/3p)

SOLAR CHARGE CONTROLLER

A solar charge controller is a device needed for monitoring and controlling the charging of battery bank connected to the PV modules. Main function of a Solar Charge Controller is to limit the rate at which electric current is added to or drawn from batteries. It prevents overcharging and protects battery from voltage fluctuation, which can reduce battery performance or lifespan, and may pose a safety risk.

Su- Kam Solar Charge Controller can be used as either a stand-alone device or a control circuitry integrated within a battery pack, a battery-powered solar device or a battery recharger. It is basically built for off-grid solar power systems and bifurcates into two varieties –

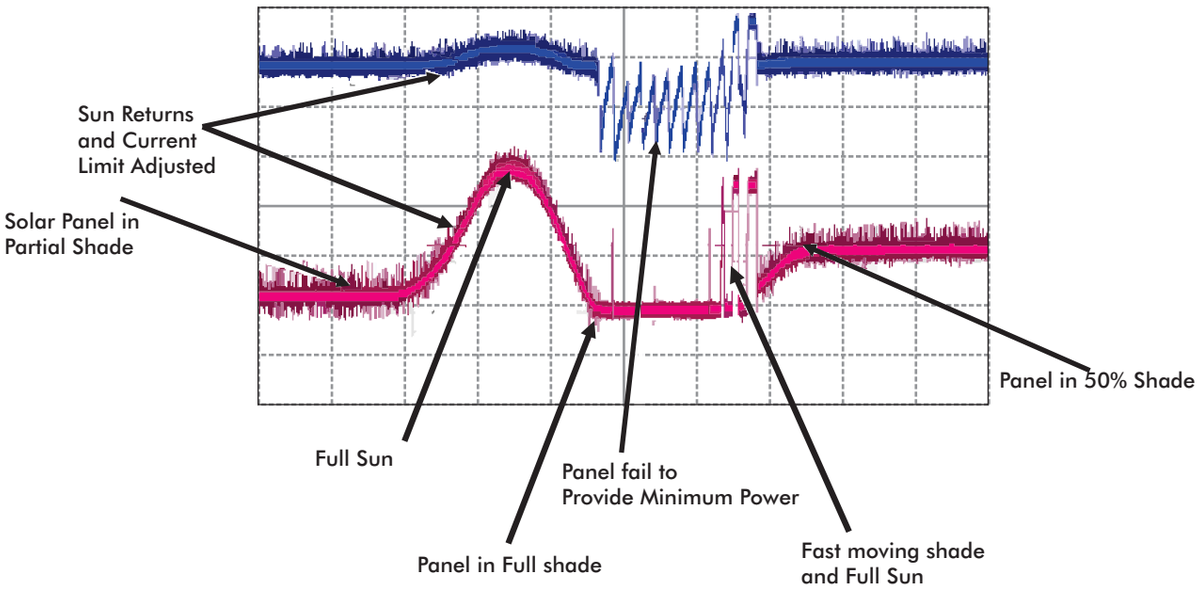
Solar Charge Controller with PWM Technology

Solar Charge Controller with MPPT Technology

PWM Charging

Traditional solar regulators featuring PWM (Pulse Width Modulation) charging operate by making a connection directly from the solar array to the battery bank. During bulk charging when there is a continuous connection from the array to the battery bank, the array output voltage is 'pulled down' to the battery voltage. The battery voltage adjusts slightly up depending on the amount of current provided by the array and the size and characteristics of the battery.

MPPT- Dynamic Relation to Full and Partial Sun



The Vmp (maximum power voltage) is the voltage where the product of the output current and output voltage (amps * volts) is greatest & output power (watts = amps * volts) is maximized.

Module wattage ratings (e.g. 100W, 250W) are based on Pmp (maximum power) at Vmp under standard test conditions (STC).

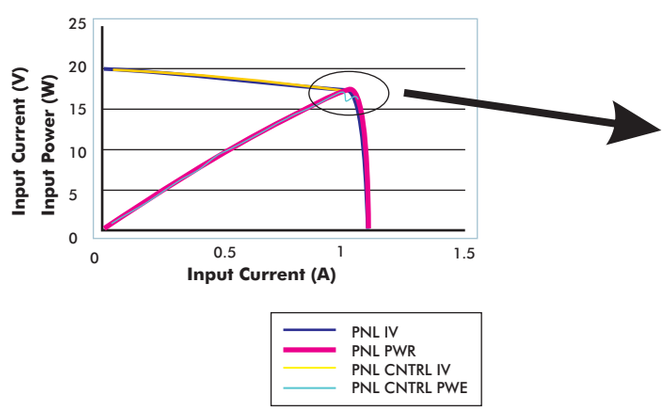
Using a nominal 12V system as an example, the battery voltage will normally be somewhere between 10 – 15 VDC. However, 12V nominal solar modules commonly have a Vmp(STC) of about 17V.

When the array (having Vmp of 17V) is connected to the batteries for charging, the batteries pull down the output voltage of the array. Thus, the array is not operating at its most efficient voltage of 17V, but rather at somewhere between 10 and 15V. The Fig SCC-1phenomenon: Because these traditional controllers rarely operate at the Vmp of the solar array, potential energy is being wasted that could otherwise be used to better charge the battery bank and maintain power for system loads. The greater the difference between battery voltage and the Vmp of the array, the more energy is wasted by a PWM controller during bulk charging.

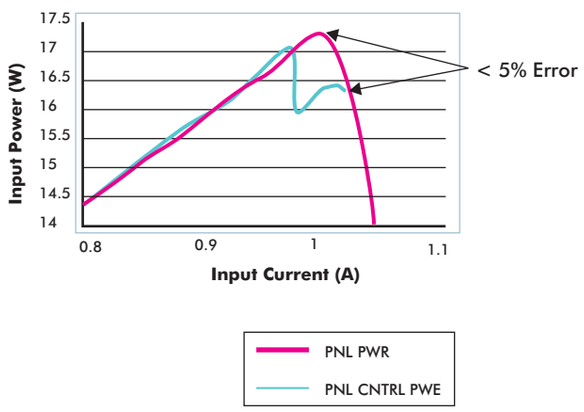
MPPT Charging

MPPT controllers feature buck bost converter technology, designed to quickly and accurately determine the Vmp (maximum power voltage) of the solar array. MPPT controllers 'sweep' the solar input to determine the voltage at which the array is producing the maximum amount of power. The controller harvests power from the array at this Vmp voltage and converts it down to battery voltage, boosting charging current in the process.

Current and Voltage with Resistive Load and CS51221



Current and Voltage with Resistive Load and CS51221



Because input power is equal to the output power of the controller (assuming 100% efficiency, neglecting wiring and conversion losses), it follows that a down-conversion of voltage corresponds to a proportional increase in current. Power (watts) is equal to the product of voltage and current, therefore, if voltage is reduced current must be increased to keep the input/output power equal.

Assuming 100% efficiency

Input Power = Output Power

Volts In * Amps In = Lower Volts Out * Higher Amps Out For example: a 100W panel (Vmp of 17V) is used to charge a battery at 12V with a MPPT controller. In ideal conditions, 5.88A of solar current flow into the MPPT (100W / 17V = 5.88A). But the output voltage (battery voltage) is 12V, meaning current flow to the battery is 8.33A (100W / 12V = 8.33A). You can see that the greater the voltage difference between the Vmp and the battery, the more "boost" current the battery will receive. The graph on the left illustrates the advantage of operating at the MPPT.A consequence of getting more "boost" when the voltage difference is greater: the less charged the batteries are (lower battery voltage), the more "boost" current they will receive. This is precisely the time when batteries will benefit from an increased amount of charging current.

Environmental Considerations

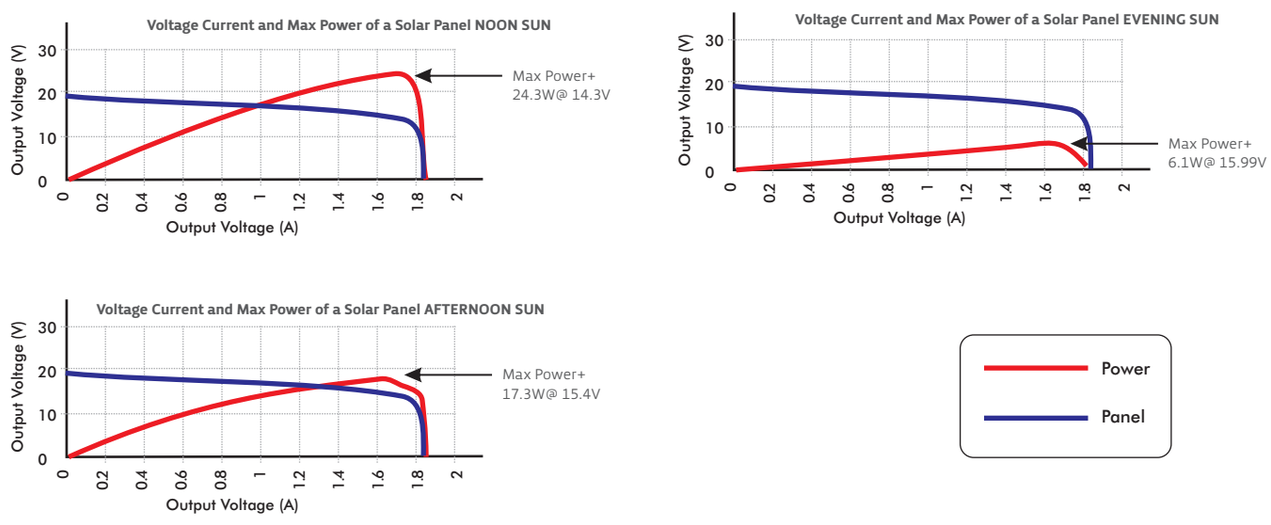
Environmental conditions will cause the Vmp of a solar array to fluctuate with partial array shading and module temperature having the most impact. MPPT technology allows the system to track the changing Vmp and maximize energy harvest in any environmental conditions.

Another noticeable increase in charging efficiency, or taking advantage of the voltage differential "boost" will be seen in colder temperatures. As solar modules drop in temperature, their Vmp increases Using a standard PWM regulator, a decrease in temperature would correspond in almost no change in power. Since the array current stays the same the charging current picks nothing up from the increased voltage. However, an MPPT controller tracks the increasing Vmp and converts the excess voltage being produced into additional charging current. In general, any rise in Vmp will increase an MPPT controller's harvest relative to a PWM controller. (Conversely, any drop in Vmp will decrease an MPPT controller's harvest relative to a PWM controller).

As seasons change, the angle of the sun striking a solar module will change as well (assuming stationary modules). The greater the angle of incidence, the less power a module will ultimately produce. During times of the year where the angle of incidence is greatest (and relative power output is decreased), MPPT technology is very useful for harvesting the maximum amount of energy.

MPPT controllers can play a big role in helping improve system performance, especially autonomy considerations, for keeping the batteries charged during the winter months with less daylight hours and sometimes poor incident angle. Again, the additional "boost" is the greatest when it may be needed the most.

POWER AND VOLTAGE FOR A SOLAR PANEL



Array Sizing for PWM Regulators

The first consideration in sizing the array for a PWM controller is open circuit voltage (Voc). Every controller has a maximum input voltage rating. The array must have a temperature compensated Voc less than the controller's maximum input voltage rating. During PWM switching cycles, the controller input is exposed to the array open circuit voltage. Using an array with a temperature compensated Voc greater than the controller input rating will damage the controller. Next, consider the maximum power voltage (Vmp). The Vmp of the array needs to be higher than the battery's maximum charging voltage.

A PV module's output current will decrease significantly at voltages higher than Vmp and will be 0 Amps at Voc. Therefore, the temperature compensated Vmp of the array should be higher than full battery voltage to ensure effective charging over the entire battery voltage range.

Finally, the current output of the array is considered. Unlike MPPT controllers, standard PWM controllers are not able to "boost" the amount of charging current by converting excess input voltage into amperage. This means that the input current from the solar array will be equal to the output current delivered to the battery. The solar array must be sized so that the short circuit current (Isc) does not exceed the nameplate current rating of the controller being used. An array with Isc greater than the current rating of the regulator may consistently trip overcurrent protections or damage the unit.

Array Sizing for MPPT Regulators

As with PWM regulators, the most basic concern when sizing an MPPT solar array is open circuit voltage (Voc). The temperature compensated (see Appendix) Voc of the array must be less than the maximum input voltage rating of the MPPT controller. Higher Voc has the potential to damage the unit.

For a given MPPT current rating and nominal system voltage, there is an effective maximum solar array wattage that can be used. Morningstar MPPT controllers have current ratings which specify the maximum battery charge current the unit can support. NOTE: The battery charge current will be lower than the solar input current due to the MPPT's ability to "boost" NOTE: The Vmp of the array should be higher than, but as close to, the maximum battery voltage as possible. Vmp significantly higher than max battery voltage reduces efficiency and puts more stress on the switching components of the regulator. Typically, for proper performance, 36 Cell or 72 Cell off grid modules (Vmp ≈ 17 to 18 V for every 12V nominal battery voltage) should be used with PWM controllers.charging amperage. The MPPT output current rating multiplied by the battery voltage is the maximum amount of power which can be used for charging the batteries. Any amount of power in excess of this could be lost when the controller limits the charging current to the maximum output current level.

It is important to note that exceeding the maximum array wattage for a given controller/nominal voltage combination will not damage the controller. Any wattage in excess of the max array wattage will simply be lost. (i.e. Using a 300W array in a system where the max array W is only 200W will not damage the controller, but the 300W array will have an operating power of approximately200W maximum)

Appendix - Temperature Compensation

It is important to take into account temperature compensation and understand how it relates to both the output voltage and output current of a solar module.

Solar modules have performance ratings under standard test conditions (STC); normally a cell temperature of 25°C and 1000W/m2 irradiance. Actual operating conditions will, of course, vary from STC. Manufacturers publish temperature coefficients which can be used to determine module output current/voltage under expected conditions. The two most important are the Voc and Isc Temperature Coefficients.

The Voc temp coefficient, specified in volts per °C (or °F), is a negative value. This indicates that the open circuit voltage of the module has an inverse relationship with temperature (Voc decreases with increasing temperature and increases with decreasing temperature). When determining if the Voc of an array is appropriate for the controller's maximum input voltage, it is essential to take into account temperature effects. In warm weather, the Voc of a module may be low enough to use with a certain controller. However, as seasons change and temperature drops, the Voc may rise past a voltage safe to use with that controller.

Worst case temperature effects should always be used when sizing an array. For example: the Voc of a module under STC (25°C) is 21V. The Voc temp coefficient is -0.05V/°C. If the record low temperature for the area in which the module will be placed is -10°C.

The Isc temp coefficient, specified in amps per °C (or °F), is a positive value. This indicates that the short circuit current will rise with increasing temperature and fall with decreasing temperature. Normally, the Isc coefficient is small enough to be neglected.

SOLAR CHARGE CONTROLLER

PWM

5A/12V, 10A/12V, 20A/12V-48V, 30A/12V-48V,
40A-45A/12V-48V, 40A/96V, 40A/180,
40A/240V, 30A/360V, 60A/120V, 50A/110V

MPPT

20A/24V, 20A/48V

Solar Charge Controller

PWM Range

Product Code: SLR-SC-OT-01200-00082

PWM Range - 5A/12V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

Features

- Excellent EMC design
- Nominal system voltage automatic recognition
- Highly efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery

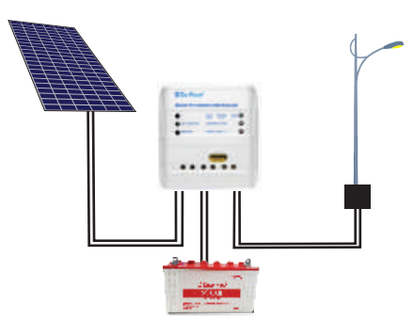
Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

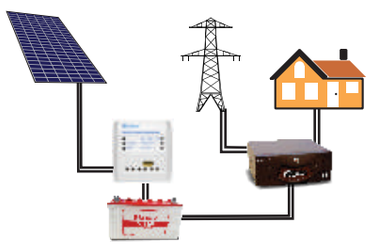
Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

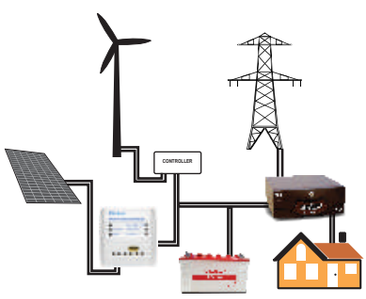
INSTALLATION DIAGRAM



For Street Light Application



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System

Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

TECHNICAL SPECIFICATIONS

Model	LVD_SCC5 : 12V
Technology	MOSFET based Series regulator (Common Positive)
Precise Control	Through micro controller
Voltage Rating	12 Volt Battery (PV<25V)
Charging current	5A
Bulk Voltage	14.2 V (13.4-15 Volts)
Float to Bulk Transition	Below float setting level for a cumulative period of 1 hour
Absorption Period	For a cumulative period of 1 hour at Max. Bulk Level
Float Voltage	13.6 V
Low Voltage Load Disconnect	11.4V/Battery
Low Voltage Load Disconnect Recovery	12.8V/Battery
Battery deep Discharge charger cut-off	≤ 7V/Battery
Battery deep Discharge charger cut off recovery	> 8V/Battery
High Battery Charger OFF	15.5V
High Battery Recovery Charger ON	14.5V
PV High Cut	30V
PV High Cut Recovery	25V
Automatic Load/ Charger restart time after high current	3.5minutes

Protections	
Over Current	>120% system will shutdown
Output Over Voltage	Provided
Battery over charge / Deep discharge protection	Provided
PV/ Battery Reverse	Provided
Reverse Current Flow From Battery to Solar array	Provided

General	
* Operating Temp.	0°C to 40°C
Storage Temp.	0°C to 55°C
Wire Terminals	suitable for 8mm²
Relative Humidity	0-95% (NC)
Dimensions (WxDxH) in mm	134 x 131 x 38
Weight (approx.)	275 gm.

Note: * 1. For operating in minus degree temperature i.e upto -25°C charge controller are available on demand.
2. Specifications are subject to change without prior notice.

Solar Charge Controller

PWM Range

Product Code: SLR-SC-LC-01200-00165

PWM Range - 10A/12V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

Features

- Excellent EMC design
- Nominal system voltage automatic recognition
- Highly efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery

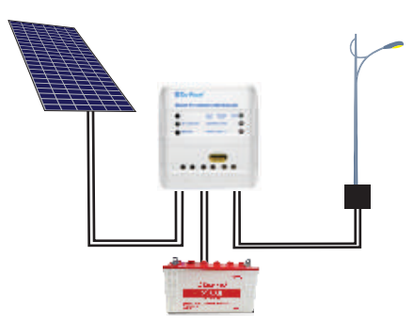
Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

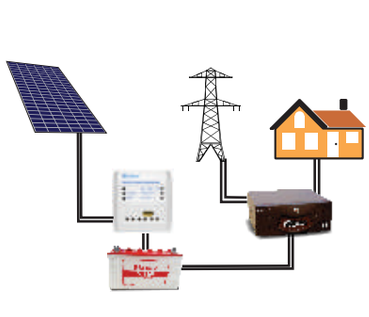
Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

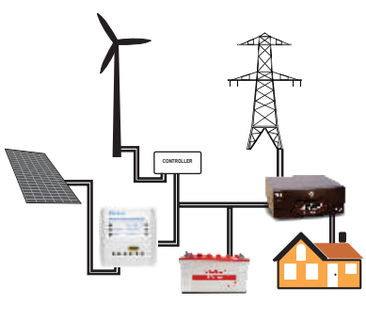
INSTALLATION DIAGRAM



For Street Light Application



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System

Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

TECHNICAL SPECIFICATIONS

Model	LVD_SCC10 : 12V
Technology	MOSFET based Series regulator (Common Positive)
Precise Control	Through micro controller
Voltage Rating	12 Volt Battery (PV<25V)
Charging current	10A
Bulk Voltage	14.2 V (13.4-15 Volts)
Float to Bulk Transition	Below float setting level for a cumulative period of 1 hour
Absorption Period	For a cumulative period of 1 hour at Max. Bulk Level
Float Voltage	13.6 V
Low Voltage Load Disconnect	11.4V/Battery
Low Voltage Load Disconnect Recovery	12.8V/Battery
Battery deep Discharge charger cut-off	≤ 7V/Battery
Battery deep Discharge charger cut off recovery	> 8V/Battery
High Battery Charger OFF	15.5V
High Battery Recovery Charger ON	14.5V
PV High Cut	30V
PV High Cut Recovery	25V
Automatic Load/ Charger restart time after high current	3.5minutes

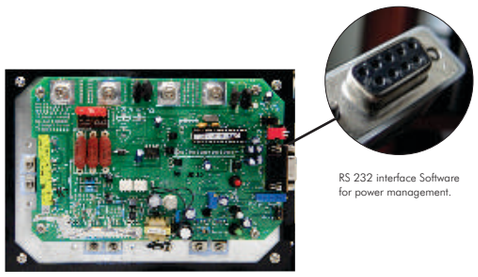
Protections	
Over Current	>120% system will shutdown
Output Over Voltage	Provided
Battery over charge / Deep discharge protection	Provided
PV/ Battery Reverse	Provided
Reverse Current Flow From Battery to Solar array	Provided

General	
* Operating Temp.	0°C to 40°C
Storage Temp.	0°C to 55°C
Wire Terminals	suitable for 8mm²
Relative Humidity	0-95% (NC)
Dimensions (WxDxH) in mm	134 x 131 x 38
Weight (approx.)	275 gm.

Note: * 1. For operating in minus degree temperature i.e upto -25°C charge controller are available on demand.
2. Specifications are subject to change without prior notice.

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

Product Code: SLR-CC-OT-04800-00020

PWM Range - 20A/12V-48V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

Working Principle

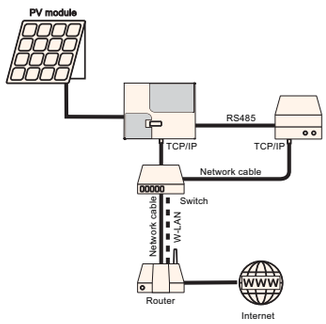
The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

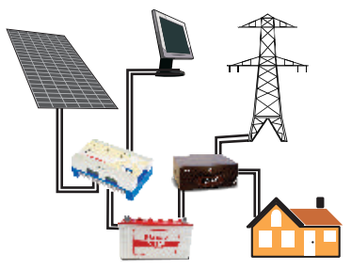
Features

- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery

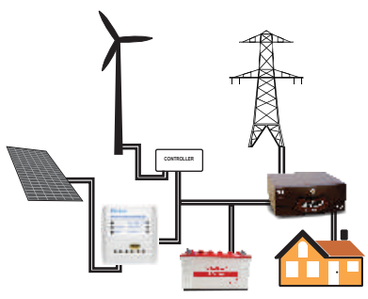
INSTALLATION DIAGRAMS



Solar Net Monitoring System for Charge Controller



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System

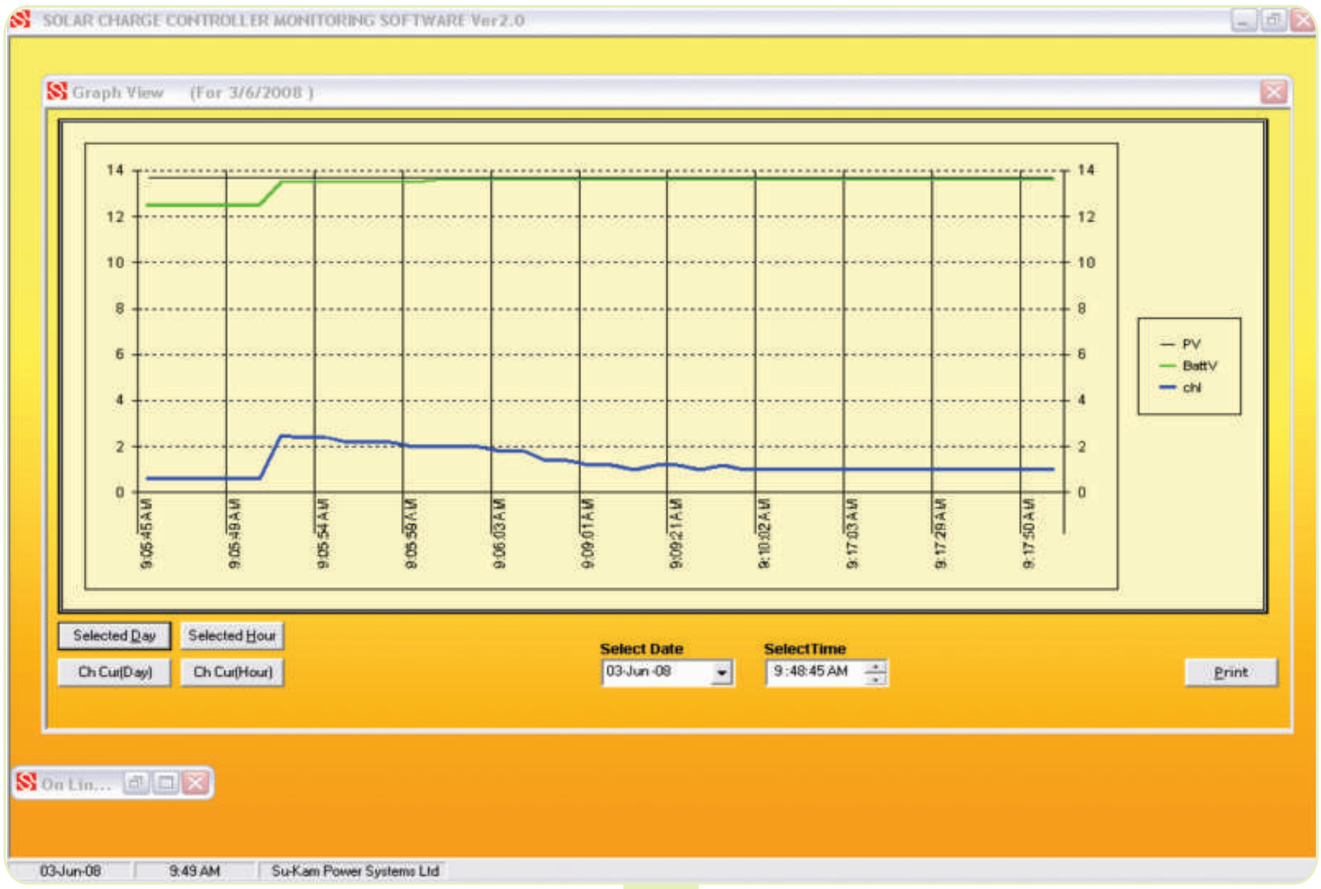
Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

Solar Charge Controller Monitoring Software



TECHNICAL SPECIFICATIONS

ELECTRICAL: SOLAR CHARGE CONTROLLER WITHOUT LVD

Model	SCC10A - 45A
Type	Series regulator common negative
Technology	Micro controller based control using MOSFET
System Voltage (configurable)	12 Volt
Charging current	10A - 15A, 20A , 30A, 40A - 45A
Bulk voltage	14.2V
	(Adjustable 13.2-15 volts)
Absorption period	Held battery voltage at bulk setting for a cumulative period of 1 hour
Float voltage	13.5V
Equalizing voltage	Bulk voltage +1V
Temperature comp. coefficient	-3mV to -5mV/°C/cell (25°C Reference)
Temperature comp. set points	Bulk, Absorption, Float and Equalization mode
Data Monitoring	Through RS-232

INDICATIONS: LEDS ARE PROVIDED FOR EASY MONITORING OF THE SYSTEM.

LED	Main Function	LED Status	Sub Function
Green	Charging mode	Blinking with long off time	Bulk stage
		Blinking with equal interval	Absorption stage
		Continuously on	Float stage
Green/Red/ Orange (Dual LED)	Equalization mode with Red/Green color	Green continuously on	Manual mode
		Red continuously on	Auto mode
		Green Blinking with equal interval	Equalization on in manual mode
		Red Blinking with equal interval	Equalization on in auto mode
	Fault Display with orange color	Continuously on	Wrong battery selection
		Blinking with equal interval	Array over current
		Blinking with long off time	High temperature
Red	Reverse Polarity	Continuously on	Array/battery reverse polarity

Charge Controller Start Time	25 Sec. ± 5 Sec

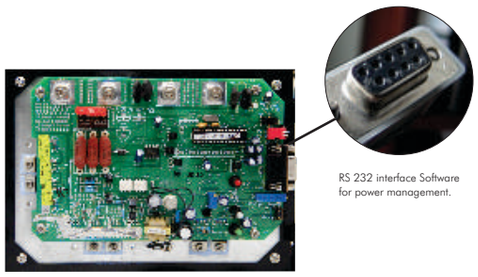
GENERAL:

*Operating Ambient Temperature	0°C to 40°C
Storage Temperature	0°C to 55°C
Wire Terminals	Suitable for $10mm^2/25mm^2$ (max) cable
Relative Humidity	0-95% (NC)
Dimensions (WxDxH) in mm	227 x 140 x 75
Weight (approx.)	1.1 Kg upto 15A / 1.4 Kg for above 20A Models

Note: * 1. For operating in minus degree temp. i.e. lower than equal to -25°C Charge controllers are available on demand.
2. Specifications are subject to change without prior notice.

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

Product Code: SLR-SC-OT-04800-02000

PWM Range - 30A/12V-48V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

Working Principle

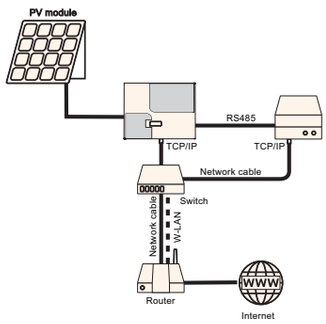
The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

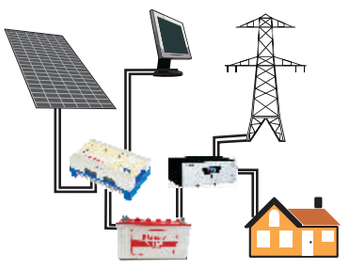
Features

- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery

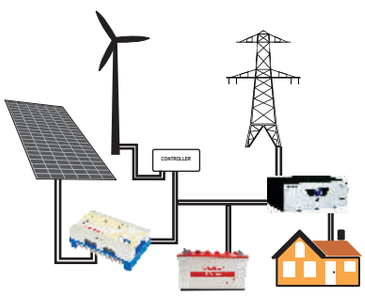
INSTALLATION DIAGRAM



Solar Net Monitoring System for Charge Controller



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
- Telecom Grid Solar System

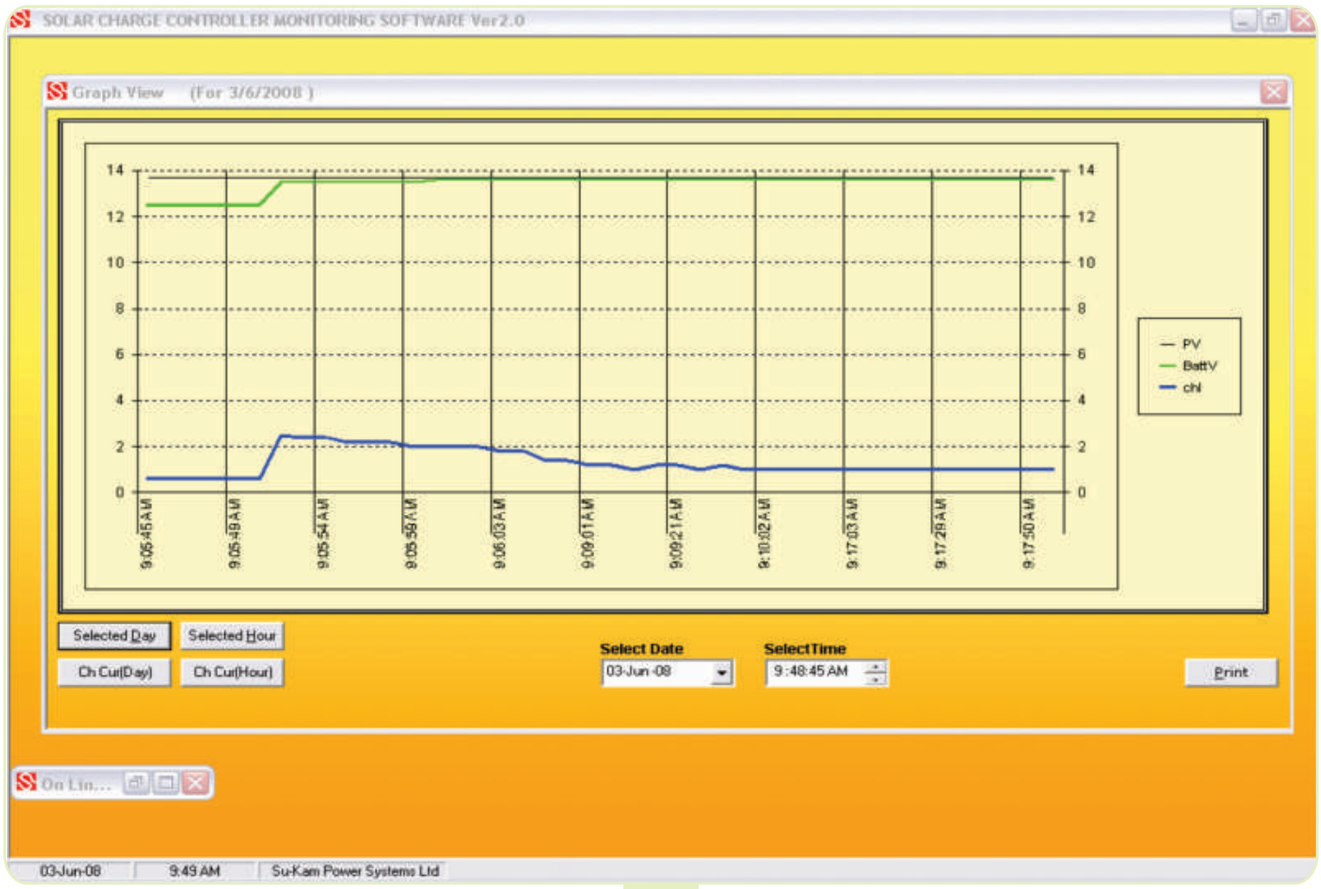
Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

Solar Charge Controller Monitoring Software



TECHNICAL SPECIFICATIONS

ELECTRICAL: SOLAR CHARGE CONTROLLER WITHOUT LVD

Model	SCC10A - 45A
Type	Series regulator common negative
Technology	Micro controller based control using MOSFET
System Voltage (configurable)	24 Volt
Charging current	10A - 15A, 20A , 30A, 40A - 45A
Bulk voltage	28.4V
	(Adjustable 26.4-30 volts)
Absorption period	Held battery voltage at bulk setting for a cumulative period of 1 hour
Float voltage	27V
Equalizing voltage	Bulk voltage +2V
Temperature comp. coefficient	-3mV to -5mV/°C/cell (25°C Reference)
Temperature comp. set points	Bulk, Absorption, Float and Equalization mode
Data Monitoring	Through RS-232

INDICATIONS: LEDS ARE PROVIDED FOR EASY MONITORING OF THE SYSTEM.

LED	Main Function	LED Status	Sub Function
Green	Charging mode	Blinking with long off time	Bulk stage
		Blinking with equal interval	Absorption stage
		Continuously on	Float stage
Green/Red/ Orange (Dual LED)	Equalization mode with Red/Green color	Green continuously on	Manual mode
		Red continuously on	Auto mode
		Green Blinking with equal interval	Equalization on in manual mode
		Red Blinking with equal interval	Equalization on in auto mode
	Fault Display with orange color	Continuously on	Wrong battery selection
		Blinking with equal interval	Array over current
		Blinking with long off time	High temperature
Red	Reverse Polarity	Continuously on	Array/battery reverse polarity

Charge Controller Start Time	25 Sec. ± 5 Sec

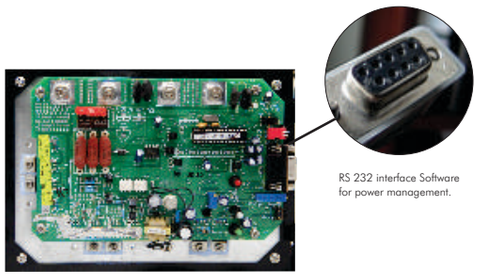
GENERAL:

*Operating Ambient Temperature	0°C to 40°C
Storage Temperature	0°C to 55°C
Wire Terminals	Suitable for $10mm^2/25mm^2$ (max) cable
Relative Humidity	0-95% (NC)
Dimensions (WxDxH) in mm	227 x 140 x 75
Weight (approx.)	1.1 Kg upto 15A / 1.4 Kg for above 20A Models

Note: * 1. For operating in minus degree temp. i.e. lower than equal to -25°C Charge controllers are available on demand.
2. Specifications are subject to change without prior notice.

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

Product Code: SLR-SC-OT-04800-03000

PWM Range - 40A-45A/12V-48V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

Working Principle

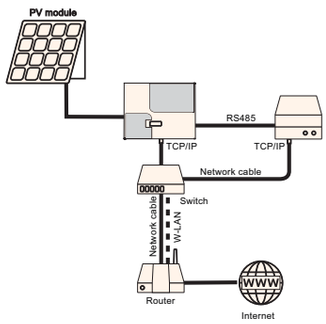
The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

Features

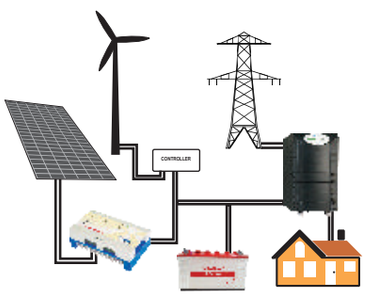
- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery

INSTALLATION DIAGRAM



Solar Net Monitoring System for Charge Controller

For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
- Telecom Grid Solar System

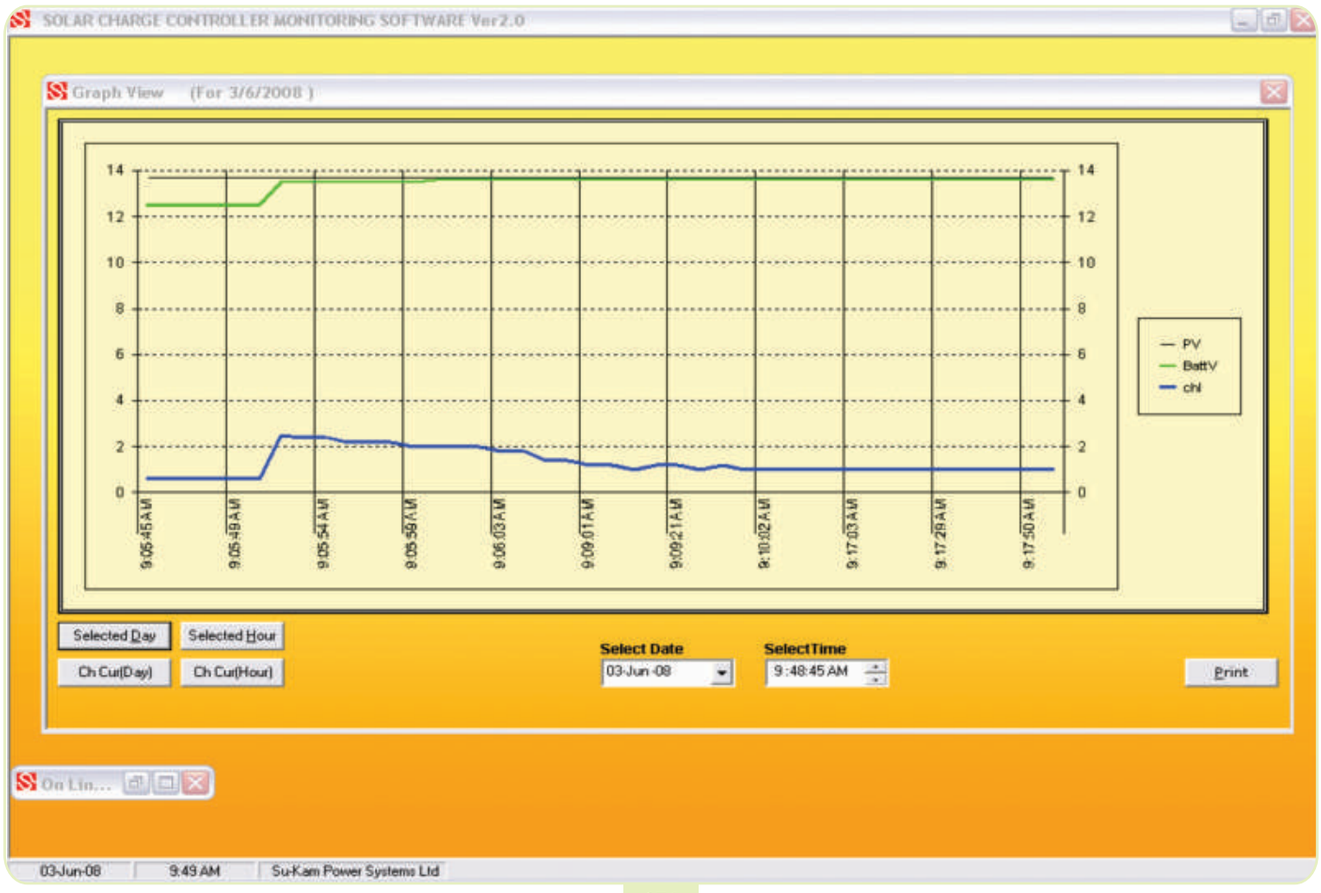
Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

Solar Charge Controller Monitoring Software



TECHNICAL SPECIFICATIONS

ELECTRICAL: SOLAR CHARGE CONTROLLER WITHOUT LVD

Model	SCC10A - 45A
Type	Series regulator common negative
Technology	Micro controller based control using MOSFET
System Voltage (configurable)	48 Volt
Charging current	10A - 15A, 20A , 30A, 40A - 45A
Bulk voltage	56.8V
	(Adjustable 52.8-60 volts)
Absorption period	Held battery voltage at bulk setting for a cumulative period of 1 hour
Float voltage	54V
Equalizing voltage	Bulk voltage +4V
Temperature comp. coefficient	-3mV to -5mV/°C/cell (25°C Reference)
Temperature comp. set points	Bulk, Absorption, Float and Equalization mode
Data Monitoring	Through RS-232

INDICATIONS: LEDS ARE PROVIDED FOR EASY MONITORING OF THE SYSTEM.

LED	Main Function	LED Status	Sub Function
Green	Charging mode	Blinking with long off time	Bulk stage
		Blinking with equal interval	Absorption stage
		Continuously on	Float stage
Green/Red/ Orange (Dual LED)	Equalization mode with Red/Green color	Green continuously on	Manual mode
		Red continuously on	Auto mode
		Green Blinking with equal interval	Equalization on in manual mode
		Red Blinking with equal interval	Equalization on in auto mode
	Fault Display with orange color	Continuously on	Wrong battery selection
		Blinking with equal interval	Array over current
		Blinking with long off time	High temperature
Red	Reverse Polarity	Continuously on	Array/battery reverse polarity

Charge Controller Start Time	25 Sec. ± 5 Sec

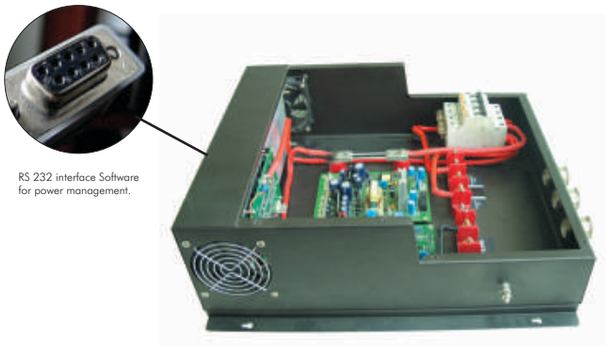
GENERAL:

*Operating Ambient Temperature	0°C to 40°C
Storage Temperature	0°C to 55°C
Wire Terminals	Suitable for $10mm^2/25mm^2$ (max) cable
Relative Humidity	0-95% (NC)
Dimensions (WxDxH) in mm	227 x 140 x 75
Weight (approx.)	1.1 Kg upto 15A / 1.4 Kg for above 20A Models

Note: * 1. For operating in minus degree temp. i.e. lower than equal to -25°C Charge controllers are available on demand.
2. Specifications are subject to change without prior notice.

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

PWM Range - 40A/96V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

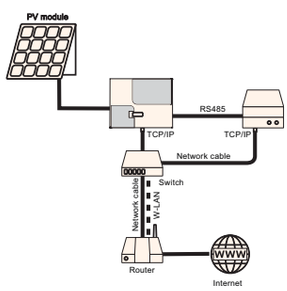
Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

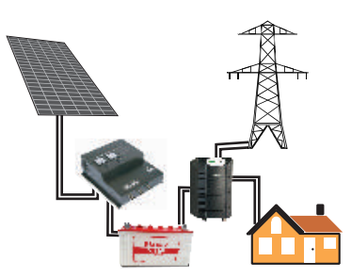
The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

Features

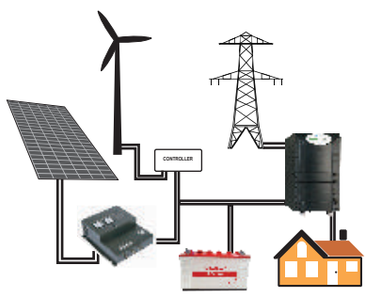
- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery



Solar Net Monitoring System for Charge Controller



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
- Telecom Grid Solar System

Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

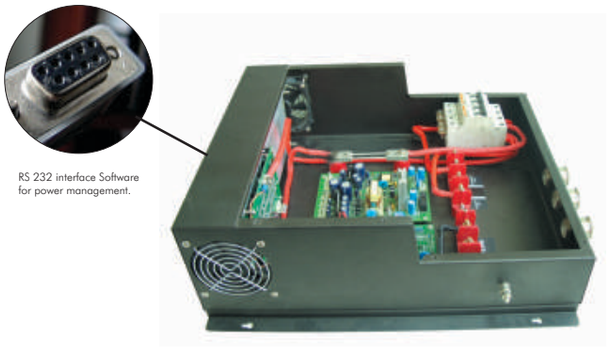
- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

TECHNICAL SPECIFICATIONS

MODELS	
Charging Current Imax.	96V
Type	40A
Maximum I/P PV Voltage	Series Regulator Common Positive
Solar Array	25V Per 36cell Solar module
Charge Controller Start Time	Single Array
Bulk Voltage	25 Sec.± 5 Sec.
Adjustable Bulk Voltage	141V ± 1V
Transition from float to bulk	132V-150V
Float Voltage	Below float level for a cumulative period of 1 hour
Equalization	135V ± 1V
Low Battery Indication Reconnect	110V ±1 V
Battery High Charging Cut off	122V ±1 V
Battery High Charging Cut off	144V ± 1V
Reconnect	135V ± 1V
PROTECTION	
Automatic Charger Restart Time	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
after High Current	3.5 Minutes
Over Current Shutdown	≥ 110%
High Temperature Charger Comp.	> 75°C ±5°C
High Temperature Charger	< 60°C ±5°C
Reconnect	≥50°C
Cooling fan ON	≥45°C
Cooling fan OFF	
ENVIRONMENTAL	
Operating Temp.(in-house type test)	0°C to + 40°C
Storage Temp.(in-house type test)	0°C to + 55°C
Relative Humidity	0-95% Non-Condensing
IP Rating	IP-20
Design Serviceuse	Indoor
ENCLOSURE	
Mounting Type	Suitable for wall mounting
Size (WxDxH) ± 10mm	400x475x151
Weight (approx.) (Kg) ± 400gm	9.75Kg.

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

Product Code: SLR-CC-SC-18000-00040

PWM Range - 40A/180V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

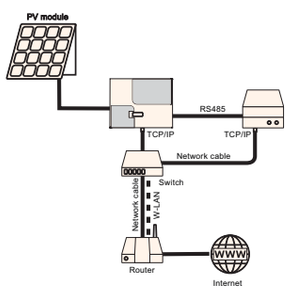
Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

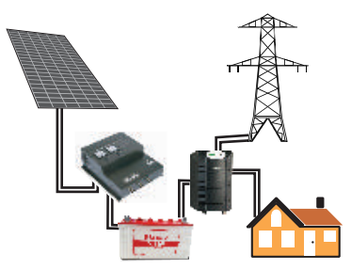
The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

Features

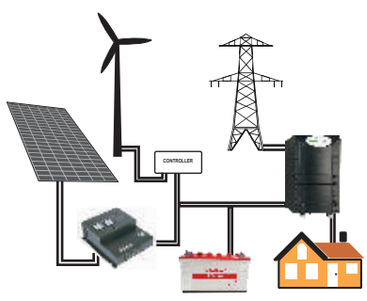
- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery



Solar Net Monitoring System for Charge Controller



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
- Telecom Grid Solar System

Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

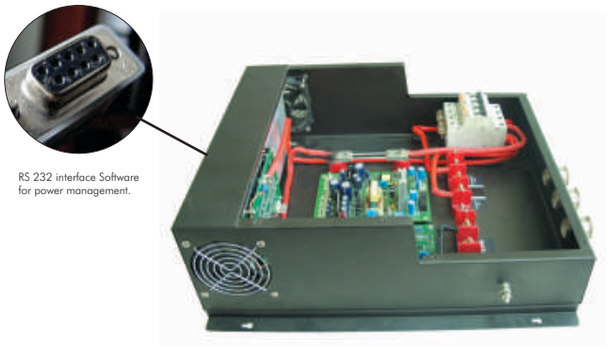
TECHNICAL SPECIFICATIONS

Parameters	Specified Value
INPUT	Single SPV array has: Open circuit voltage (Voc) = 285 to 375 volts DC Maximum current (Im)= 40A max
OUTPUT	With 180 volt lead acid battery bank connected to charge controller Bulk stage= 216 volts (adjustable from 203 to 230 volts) Float stage= 211 volts (with 10 volts below from bulk setting level) NOTE: Transition from Float to Bulk charging will take place if battery voltage drops below float level for a cumulative period of one hour. All voltage levels have a tolerance of ± 1volt
INDICATIONS	LED indications for Bulk on/Float on Temperature high/Current high Battery low/Battery high Solar/Battery reverse
OUTPUT HIGH PROTECTION	Charging Cut-off = 230±1 volt Charging Reconnect = 183 volts
TEMPERATURE SENSING FAN OPERATION	Fan ON = 50°C Fan OFF= 40°C
METERING	Analog type voltmeter and ammeter with a selector switch for monitoring voltage of solar array/battery and charging current
OPERATING TEMPERATURE	Ambient Temperature 0 to 40°C
PROTECTION	1.Reverse current flow from battery to solar array during night. 2.Self-Protection against excessive temperature on heat sink. 3.Solar/battery reverse. 4.Output over voltage. 5.Short circuit.
ENCLOSURE	MS powder coated, rugged in construction and suitable for wall mounting
SIZE & Wt.	475(d)x400(w)x151(h)mm & 9.75Kgs

NOTE : Technical specifications are subject to change without any prior notice.

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

Product Code: SLR-CC-SC-24000-00040

PWM Range - 40A/240 V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

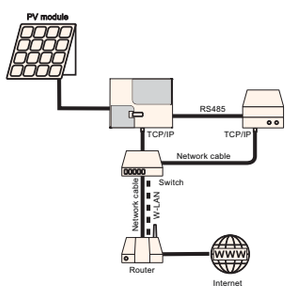
Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

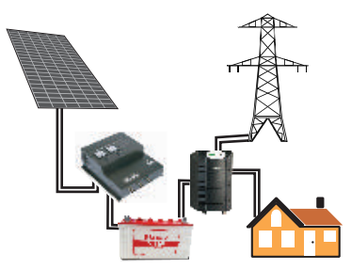
The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

Features

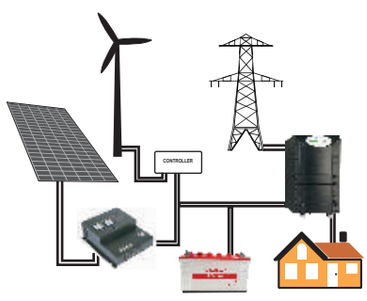
- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery



Solar Net Monitoring System for Charge Controller



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
- Telecom Grid Solar System

Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

TECHNICAL SPECIFICATIONS

MODEL	SCC240CN
Type	Series Regulator Common Negative
Technology	Microcontroller Based Control
System Voltage	240V
ELECTRICAL PARAMETERS	
Charging current	40Amp
Solar Array	Single Array
Bulk Voltage	282 ± 2V
	Adjustable 270-290V
Absorption period	Hold battery voltage at bulk setting for a cumulative period of 1 hour
Float voltage	270V ± 2V
INDICATIONS	LED Indications for Bulk Mode, Float Mode, High Temperature, High Current, Low Battery,
	High Battery, Array/Battery Reverse Polarity.
	Analog type voltmeter and ammeter with a selector
	switch for monitoring voltage of solar array/battery and charging current.
ENVIRONMENTAL PARAMETERS	
Operating Temperature	0°C to + 40°C
Storage Temperature	0°C to + 55°C
Relative Humidity	0-95% Non-Condensing
Dimensions WxDxH (in mm)	400 x 475 x 151
Weight (in Kgs)	9.5kg

NOTE: Specifications are subject to change without prior notice.

Solar Charge Controller

PWM Range

RS 232 interface Software for power management.

Product Code: SLR-CC-OT-36000-00030

PWM Range - 30A/360V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

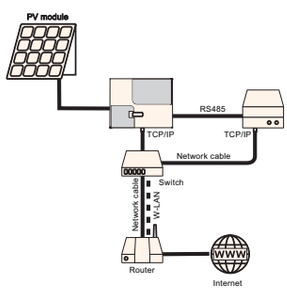
Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

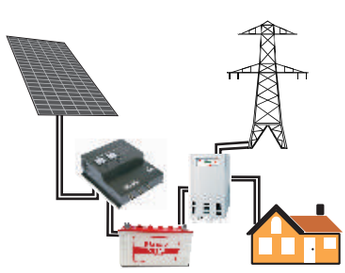
The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

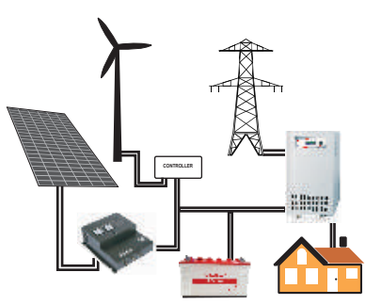
Features

- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery



Solar Net Monitoring System for Charge Controller





Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
- Telecom Grid Solar System

Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

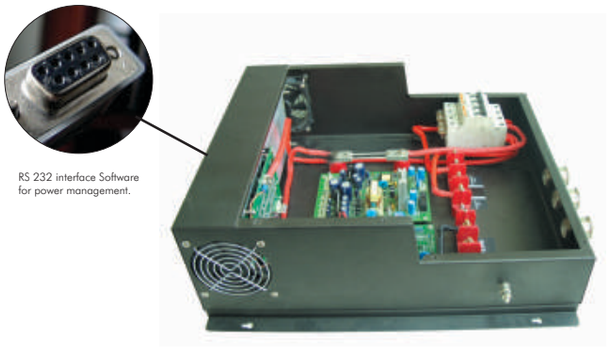
TECHNICAL SPECIFICATIONS

Model	SCC360CN
Type	Series Regulator Common Negative
Technology	Microcontroller Based Control
System Voltage	360V
ELECTRICAL PARAMETERS	
Charging current	30Amp
Solar Array	Single Array
Bulk Voltage	422 ± 2V
	Adjustable 408-436V
Absorption period	Hold battery voltage at bulk setting for a cumulative period of 1 hour
Float voltage	408V ± 2V
INDICATIONS	LED Indications for Bulk Mode, Float Mode, High Temperature, High Current, Low Battery, High Battery, Array/Battery Reverse Polarity. Analog type voltmeter and ammeter with a selector switch for monitoring voltage of solar array/battery and charging current.
ENVIRONMENTAL PARAMETERS	
Operating Temperature	0°C to + 40°C
Storage Temperature	0°C to + 55°C
Relative Humidity	0-95% Non-Condensing
Dimensions WxDxH (in mm)	400 x 475 x 151
Weight (in Kgs)	9.5kg

Specifications are subject to change without prior notice.

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

Product Code: SLR-CC-SC-12000-00060

PWM Range - 60A/120V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

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Features

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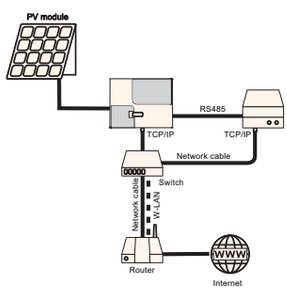
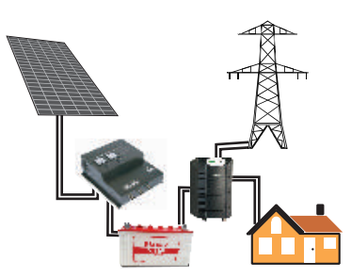
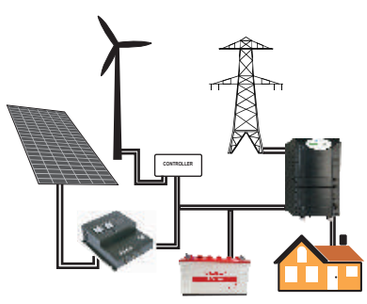
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery



Solar Net Monitoring System for Charge Controller



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
- Home Lighting System
- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
- Telecom Grid Solar System

Convenience

- Installation with ease
- Increases the battery life
- Protects the battery from Overcharging
- Compatible with any HUPS/Inverter

Certifications & Approvals

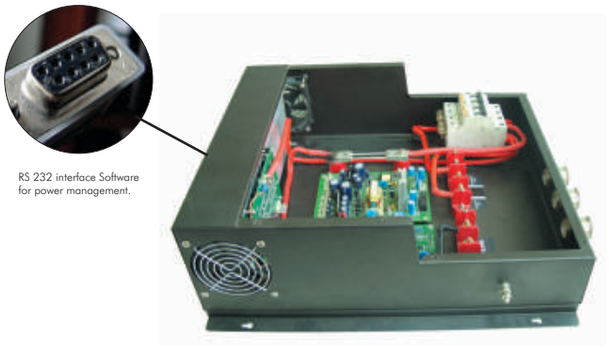
- IEC 62093
- IP 20 Rating
- Approved by MNRE, Govt.Of India
- Approved by Solar Energy Center, Govt of India.

TECHNICAL SPECIFICATIONS

MODELS	
Charging Current Imax.	120V
Type	60A
Maximum I/P PV Voltage	Series Regulator Common Positive
Solar Array	25V Per 36cell Solar module
Charge Controller Start Time	Dual Array
Bulk Voltage	25 Sec.± 5 Sec.
Adjustable Bulk Voltage	141V ± 1V
Transition from float to bulk	132V-150V
Float Voltage	Below float level for a cumulative period of 1 hour
PROTECTION	
Automatic Charger Restart Time	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
after High Current	3.5 Minutes
Over Current Shutdown	≥ 110%
High Temperature Charger Comp.	> 75°C ±5°C
High Temperature Charger	< 60°C ±5°C
Reconnect	≥50°C
Cooling fan ON	≥45°C
Cooling fan OFF	
ENVIRONMENTAL	0°C to + 40°C
Operating Temp.(in-house type test)	0°C to + 55°C
Storage Temp.(in-house type test)	0-95% Non-Condensing
Relative Humidity	IP-20
IP Rating	Indoor
Design Serviceuse	
ENCLOSURE	Suitable for wall mounting
Mounting Type	400x475x151
Size (WxDxH) ± 10mm	9.75Kg.
Weight (approx.) (Kg) ± 400gm	

Solar Charge Controller

PWM Range



RS 232 interface Software for power management.

Product Code: SLR-CC-SC-11000-00050

PWM Range - 50A/110V

Su-Kam's Solar Charger Controller is a system with advanced MOSFET based PWM Technology. The term "charge controller" refers to a device that charge the battery from solar panel.

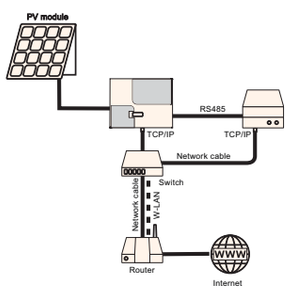
Working Principle

The controller is for off-grid solar systems. This protects the battery from getting over charged using the solar module and over discharged by the loads. The charging process has been optimized for long battery life and improved system performance.

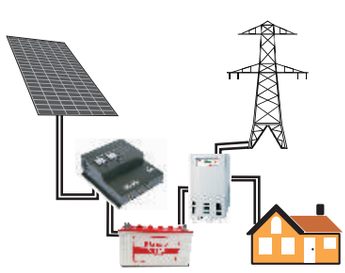
The comprehensive self-diagnostics and electronic protection functions prevent damage from installation mistakes or system faults.

Features

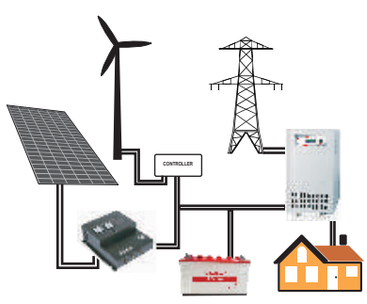
- Excellent EMC design
- Nominal system voltage automatic recognition
- High efficient Series PWM charging, increases battery life and improves the solar system performance
- Use MOSFET as an electronic switch, without any mechanical switch
- Widely used, automatically recognizes day/night
- Humanized design of browser interface, for convenience of operation
- Full control parameters setting and modification, diversified load control mode
- Gel, Sealed and Flooded battery type options
- Adopt temperature compensation, correction algorithm for charging and discharging parameters
- Automatically and improve battery life
- Electronic protection from overheating, overcharging, over discharging, over load, and short circuit.
- Reverse protection: any combination of solar module and battery



Solar Net Monitoring System for Charge Controller



For Household Application



Customization for Household Application

Solar Charge Controller

PWM Range

Electronic Protection Updates

- Over Current
- Battery Over charge Protection
- PV/Battery Reverse Polarity
- Reverse Current Flow
- High Temperature

Indicators

- Low Battery Indication
- Low Battery Reconnect Indication
- Battery High Charging Cutoff
- Charging cutoff reconnect
- Over current Shutdown

Operations/ Options

- Maximum Charging Current: 10-45A
- Single and Dual Solar Array
- Start time: 25 Sec± 5 Sec
- Maximum PV I/P Voltage : 25V per 36Cell Solar Module
- Adjustable Bulk Voltage
- Equalization through Auto/Manual Mode

Applications

- Standalone DC system
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- Street Light System
- Stand Alone Solar System
- Off-grid and Micro grid
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Convenience

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- IEC 62093
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- Approved by MNRE, Govt.Of India
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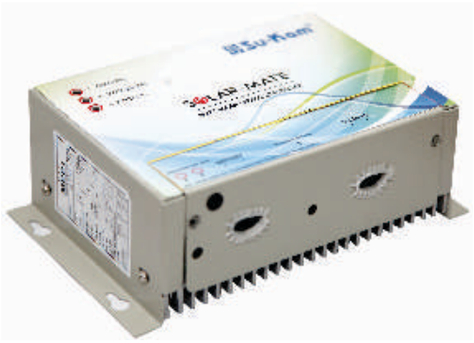
TECHNICAL SPECIFICATIONS

MODELS	
Charging Current Imax.	110V
Type	50A
Maximum I/P PV Voltage	Series Regulator Common Positive
Solar Array	25V Per 36cell Solar module
Charge Controller Start Time	Dual Array
Bulk Voltage	25 Sec.± 5 Sec.
Adjustable Bulk Voltage	131V ± 1V
Transition from float to bulk	127V-132V
Float Voltage	Below float level for a cumulative period of 1 hour
Equalization	126V ± 1V
Low Battery Indication Reconnect	100V ± 1V
Battery High Charging Cut off	114V ± 1V
Battery High Charging Cut off	142V ± 1V
Reconnect	121V ± 1V
PROTECTION	
Automatic Charger Restart Time	Over Current, Battery over Charge Protection, PV/Battery Reverse Polarity, Reverse Current Flow, High Temp.
after High Current	3.5 Minutes
Over Current Shutdown	≥ 110%
High Temperature Charger Comp.	> 75°C ±5°C
High Temperature Charger	< 60°C ±5°C
Reconnect	≥50°C
Cooling fan ON	≥45°C
Cooling fan OFF	N/A
ENVIRONMENTAL	
Operating Temp.(in-house type test)	0°C to + 40°C
Storage Temp.(in-house type test)	0°C to + 55°C
Relative Humidity	0-95% Non-Condensing
IP Rating	IP-20
Design Serviceuse	Indoor
ENCLOSURE	
Mounting Type	Suitable for wall mounting
Size (WxDxH) ± 10mm	400x475x151
Weight (approx.) (Kg) ± 400gm	9.75Kg.

Solar Charge Controller

MPPT Range



Product Code: SCC-SC-OT-02400-00020
SCC-SM-OT-04800-00020

MPPT Range - 20A/24V, 20A/48V

SolarMate MPPT is a solar charge controller with maximum Power Point tracking. it is specially designed to work with all established module technologies and is optimized for solar systems with module voltages higher than the battery voltage.

Working Principle

The advanced MPPT-tracking algorithm from Su-Kam assures that the maximum available power of the solar panel is used to charge the batteries. MPPT SolarMate with latest technology ensures full performance in all conditions, a professional battery care combined with modern design and excellent protection with MPPT Technology the charging current is boosted up to 30%.

Features

- Maximum Power Point tracker (MPPT) Based design
- Voltage and current regulation
- PWM control
- Current compensated load disconnection
- Automatic load reconnection
- Temperature compensation for charging
- Monthly maintenance charge

Electronic protection functions

- Overcharge protection
- Deep discharge protection
- Reverse polarity protection of module, load and battery
- Reverse polarity protection by internal fuse
- Automatic electronic fuse
- Short circuit protection
- Overvoltage protection at module input
- Open circuit protection without battery
- Reverse current protection at night
- Overtemperature and overload protection
- Battery overvoltage shutdown

Displays

- Multifunction led display
- Multi-coloured led
- 3 leds show operating states for operation, state of charge, fault messages

Options

- Night light function pre-set in the factory or adjustable.
- Parameterization of function values
- External temperature sensor

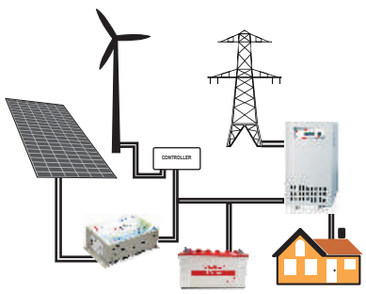
Certificates & patents

- Manufactured according to ISO 9001 and ISO14001

INSTALLATION DIAGRAM

For Household Application

INSTALLATION DIAGRAM

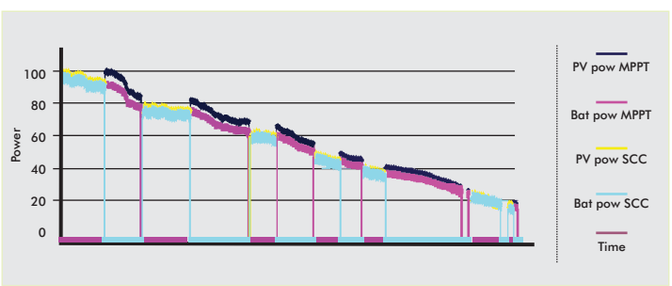


Customization for Household Application

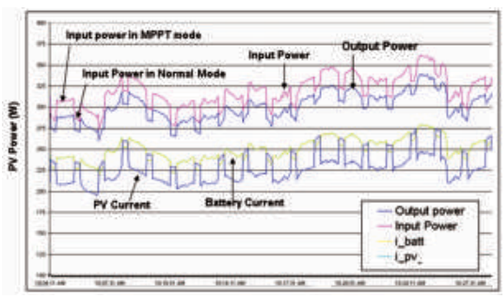
TECHNICAL SPECIFICATIONS

MODEL	MPPT SCC 12 V/24 V – 20A (with LVD and without LVD)	
Nominal Battery Voltage	12 V	24 V
Maximum Output Current /Rated Load current	20 A	
Maximum PV panel rating	12V DC system	24 V DC System
	Typical: 240 W	Typical: 480 W
	Maximum: 300Wp	Maximum: 600Wp
Maximum PV open circuit voltage	50 VDC	
Charging Stages	Four stage charging algorithm: Bulk, Absorption, Float and Equalization	
Bulk Charge	13.8 V (Adjustable 13.8V - 14.4V)	27.6 V (Adjustable 27.6V – 28.8 V)
Absorption period	Held battery voltage at bulk setting for a cumulative period of 2 hour	
Float voltage	13.7 V + temperature compensation	27.2 V + temperature Compensation
Equalization Voltage	Bulk Voltage + 1V	Bulk Voltage + 2V
Automatic Temperature	Yes	
Compensation	18mV/°C for12V battery (25°C Reference)	
LOAD CONTROLLER		
Battery Low voltage load disconnect	11.4V	22.8V
Battery Low voltage load reconnect	12.8 V	
Battery high voltage load & charging disconnect	15.5V	31V
Battery high voltage load reconnect	14.5V	29V
PV high voltage charging stop	> 30V	> 55V
PV high voltage charging reconnect	< 25V	< 48V
Over load (110%)	22A ±1A	
Short circuit (peak load current)	≥ 60A	
Nos. of over load retries / Nos. of short circuit retries	After every 3.5 min.	
PROTECTIONS FUNCTIONS		
Surge / Battery low voltage protection	Yes	
Batter/ Hi / h Voltage Protection	Yes	
Battery Open Protection	Yes; System is not ON if battery is not connected	
Battery overload / Load overload cut-off protection	Yes	
Load Short Circuit / PV high voltage protection	Yes	
Thermal Protection	If Heat sink temperature is ≥ 90 oC charging PWM OFF; when temperature falls below 70 oC charging current flows through the system	
Standby Power Consumption	£ 10 mA	
Power Conversion Efficiency	≥ 94 %	
ACCURACY		
Current	± 10%	
Voltage	± 2%	

Power obtained from MPPT and SCC vs Time



Comparison between mppt and Normal pwm based solar charge controller



ORIGINAL

No. 5769

GOVERNMENT OF INDIA

THE PATENT OFFICE

CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 220865

Date 28TH JAN. 2009

Reciprocity date*

Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to "SOLAR CHARGE CONTROLLER" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

Controller General of Patents, Designs and Trade Marks

*The reciprocity date (if any) which has been allowed and the name of the country.
Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
This Certificate is not for use in legal proceedings or for obtaining registration abroad.

DR. I. BANERJEE,
L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
3RD SEP. 2009.

Patents : Solar Charge Controller
Design: 220865

ORIGINAL

No. 9291

GOVERNMENT OF INDIA

THE PATENT OFFICE

CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217397

Date 28TH JULY 2008

Reciprocity date*

Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-03 in respect of the application of such design to "SOLAR CHARGE CONTROLLER" in the name of

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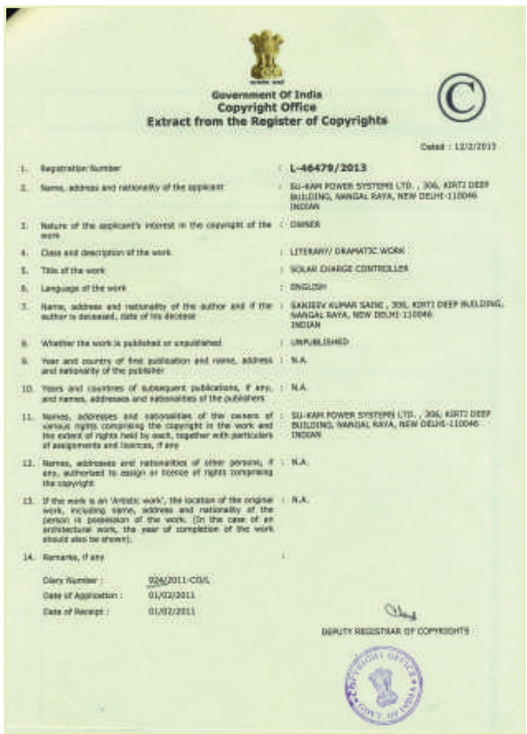
L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
30TH APRIL 2009

Patent: solar Charge Controller
Design: 217397



Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 12/2/2013

1.	Registration Number	: L-46479/2013
2.	Name, address and nationality of the applicant	: SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3.	Nature of the applicant's interest in the copyright of the work	: OWNER
4.	Class and description of the work	: LITERARY/ DRAMATIC WORK
5.	Title of the work	: SOLAR CHARGE CONTROLLER
6.	Language of the work	: ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	: SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	: UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	: N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	: N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	: SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	: N.A.
13.	If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown).	: N.A.
14.	Remarks, if any	:

Diary Number : 924/2011-CO/L
Date of Application : 01/02/2011
Date of Receipt : 01/02/2011

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: Solar Charge Controller

Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 12/2/2013

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2.	Name, address and nationality of the applicant	: SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
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5.	Title of the work	: SOLAR CHARGE CONTROLLER
6.	Language of the work	: ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	: SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	: UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	: N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	: N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	: SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	: N.A.
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Diary Number : 924/2011-CO/L
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Date of Receipt : 01/02/2011

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: solar Charge Controller

ORIGINAL

No. 5769

GOVERNMENT OF INDIA

THE PATENT OFFICE

CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 220865

Date 20TH JAN. 2009

Reciprocity date*

Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to "SOLAR CHARGE CONTROLLER" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

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32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
3RD SEP. 2009.

Patent: Solar Charge Controller Design No: 220865

Government Of India
Copyright Office
Extract from the Register of Copyrights

1. Registration No./Year	A-95454/2012
2. Name, address and nationality of the applicant	SU-KAM POWER SYSTEMS LTD., 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3. Nature of the applicant's interest in the copyright of the work	OWNER
4. Class and description of the work	ARTISTIC WORK
5. Title of the work	PCB LAYOUT OF SOLAR CHARGE CONTROLLER (240V COMMON NEGATIVE)
6. Language of the work	ENGLISH
7. Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI, 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8. Whether the work is published or unpublished	UNPUBLISHED
9. Year and country of first publication and name, address and nationality of the publisher	N.A.
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	N.A.
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14. Remarks, if any	
Diary Number	10940/2010-CO/A
Date of Application	08/10/2010
Date of Receipt	08/10/2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB layout of Solar Charge Controller (240V) common negative

ORIGINAL

No. 9291

GOVERNMENT OF INDIA

THE PATENT OFFICE

CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217397

Date 20TH JULY 2009

Reciprocity date*

Country

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L. S. DAVAR & CO.
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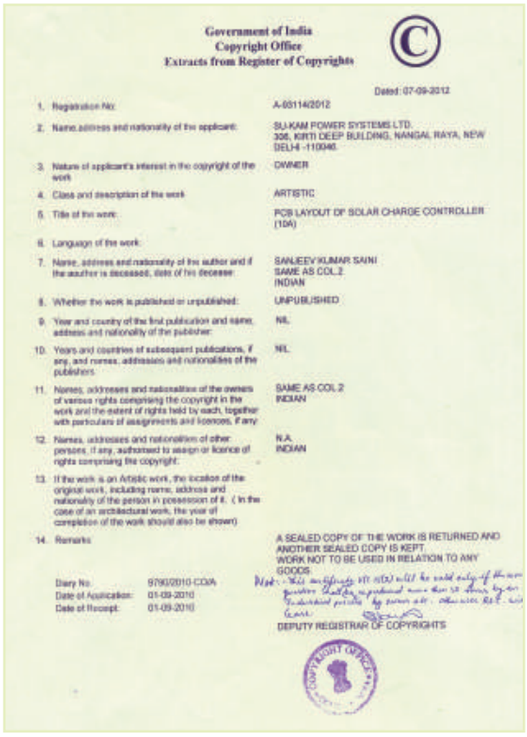
KOLKATA-700010.

Date of issue
30TH APRIL 2009

Patent: Solar Charge Controller Design No: 217397



Government of India
Copyright Office
Extracts from Register of Copyrights

Dated: 07-09-2012

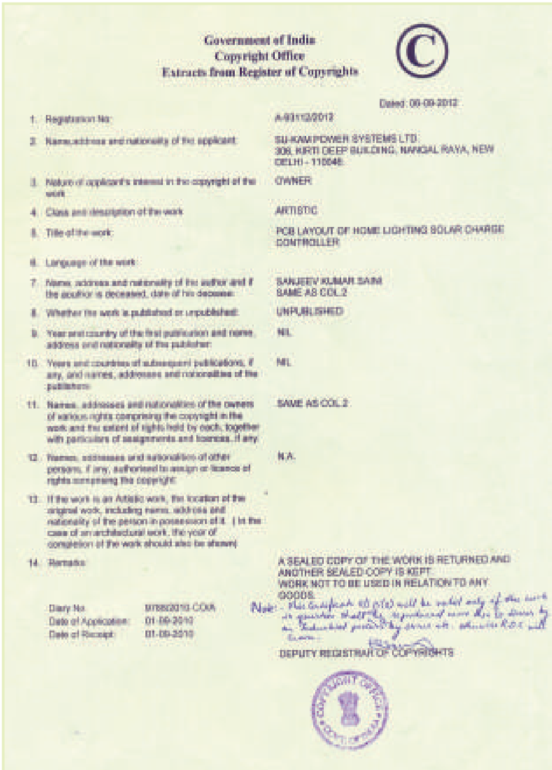
1. Registration No.	A-65114/2012
2. Name,address and nationality of the applicant	SU-KAM POWER SYSTEMS LTD. 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI -110046.
3. Nature of applicant's interest in the copyright of the work	OWNER
4. Class and description of the work	ARTISTIC
5. Title of the work	PCB LAYOUT OF SOLAR CHARGE CONTROLLER (10A)
6. Language of the work	
7. Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI SAME AS COL.2 INDIAN
8. Whether the work is published or unpublished	UNPUBLISHED
9. Year and country of the first publication and name, address and nationality of the publisher	NIL
10. Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	NIL
11. Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SAME AS COL.2 INDIAN
12. Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A. INDIAN
13. If the work is an Artistic work, the location of the original work, including name, address and nationality of the person in possession of it. (In the case of an architectural work, the year of completion of the work should also be shown)	
14. Remarks	A SEALED COPY OF THE WORK IS RETURNED AND ANOTHER SEALED COPY IS KEPT. WORK NOT TO BE USED IN RELATION TO ANY GOODS.
Diary No.	9790/2010-CO/A
Date of Application:	01-09-2010
Date of Receipt:	01-09-2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB layout of Solar charge Controller (10A)

Solar Charge Controller

Certificates & Test Reports - SCC



Government of India
Copyright Office
Extracts from Register of Copyrights

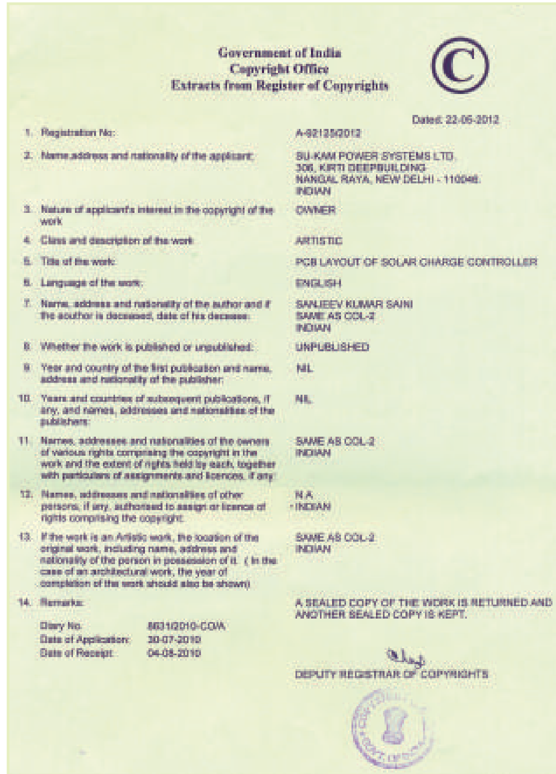
Dated: 06-09-2012

1.	Registration No:	A-93112/2012
2.	Name, address and nationality of the applicant:	SU-KAM POWER SYSTEMS LTD. 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI - 110046
3.	Nature of applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	ARTISTIC
5.	Title of the work:	PCB LAYOUT OF HOME LIGHTING SOLAR CHARGE CONTROLLER
6.	Language of the work:	
7.	Name, address and nationality of the author and if the author is deceased, date of his decease:	SANJEEV KUMAR SAINI SAME AS COL.2
8.	Whether the work is published or unpublished:	UNPUBLISHED
9.	Year and country of the first publication and name, address and nationality of the publisher:	NIL
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers:	NIL
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SAME AS COL.2
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A.
13.	If the work is an Artistic work, the location of the original work, including name, address and nationality of the person in possession of it. (In the case of an architectural work, the year of completion of the work should also be shown)	
14.	Remarks:	A SEALED COPY OF THE WORK IS RETURNED AND ANOTHER SEALED COPY IS KEPT. WORK NOT TO BE USED IN RELATION TO ANY GOODS.

Diary No: 9788/2010-CO/A
Date of Application: 01-09-2010
Date of Receipt: 01-09-2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB layout of Home Lighting
Solar Charge Controller



Government of India
Copyright Office
Extracts from Register of Copyrights

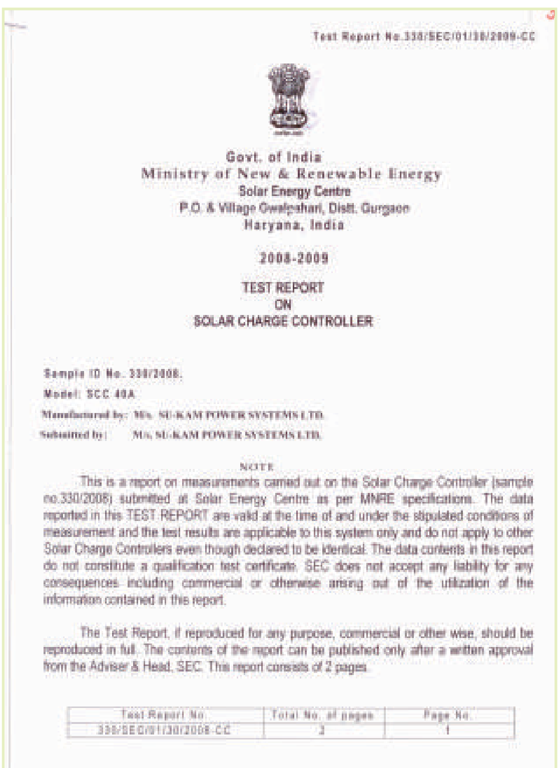
Dated: 22-05-2012

1.	Registration No:	A-92125/2012
2.	Name, address and nationality of the applicant:	SU-KAM POWER SYSTEMS LTD. 306, KIRTI DEEPBUILDING NANGAL RAYA, NEW DELHI - 110046. INDIAN
3.	Nature of applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	ARTISTIC
5.	Title of the work:	PCB LAYOUT OF SOLAR CHARGE CONTROLLER
6.	Language of the work:	ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease:	SANJEEV KUMAR SAINI SAME AS COL-2 INDIAN
8.	Whether the work is published or unpublished:	UNPUBLISHED
9.	Year and country of the first publication and name, address and nationality of the publisher:	NIL
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers:	NIL
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SAME AS COL-2 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A. INDIAN
13.	If the work is an Artistic work, the location of the original work, including name, address and nationality of the person in possession of it. (In the case of an architectural work, the year of completion of the work should also be shown)	SAME AS COL-2 INDIAN
14.	Remarks:	A SEALED COPY OF THE WORK IS RETURNED AND ANOTHER SEALED COPY IS KEPT.

Diary No: 8631/2010-CO/A
Date of Application: 30-07-2010
Date of Receipt: 04-08-2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB layout of
Solar Charge Controller



Test Report No.330/SEC/01/30/2009-CC

Govt. of India
Ministry of New & Renewable Energy
Solar Energy Centre
P.O. & Village Gwalpahari, Distt. Gurgaon
Haryana, India

2008-2009

TEST REPORT
ON
SOLAR CHARGE CONTROLLER

Sample ID No. 330/2008.
Model: SCC 40A
Manufactured by: M/s. SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s. SU-KAM POWER SYSTEMS LTD.

NOTE

This is a report on measurements carried out on the Solar Charge Controller (sample no.330/2008) submitted at Solar Energy Centre as per MNRE specifications. The data reported in this TEST REPORT are valid at the time of and under the stipulated conditions of measurement and the test results are applicable to this system only and do not apply to other Solar Charge Controllers even though declared to be identical. The data contents in this report do not constitute a qualification test certificate. SEC does not accept any liability for any consequences including commercial or otherwise arising out of the utilization of the information contained in this report.

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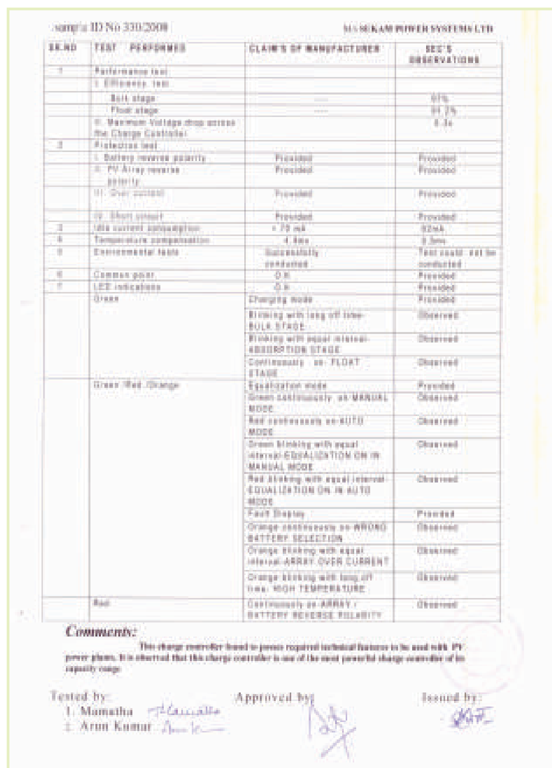
Test Report No.	Total No. of pages	Page No.
330/SEC/01/30/2008-CC	2	1

Test Report: Solar Charge Controller (40A)



Sample ID No 330/2008 M/s SUKAM POWER SYSTEMS LTD

SR.NO	TEST PERFORMED	CLAIM'S OF MANUFACTURER	SEC'S OBSERVATIONS
1	Performance test		
	i. Efficiency test		
	Bulk stage	----	97%
	Float stage	----	[illegible]
	ii. Maximum Voltage drop across the Charge Controller		[illegible]
2	Protection test		
	i. Battery reverse polarity	Provided	Provided
	ii. PV Array reverse polarity	Provided	Provided
	iii. Over current	Provided	Provided
	iv. Short circuit	Provided	Provided
3	Idle current consumption	< 70 mA	82mA
4	Temperature compensation	[illegible]	[illegible]
5	Environmental tests	Successfully conducted	Test could not be conducted
6	Common point	O.K	Provided
7	LED indications	O.K	Provided
	Green	Charging mode	Provided
		Blinking with long off time-BULK STAGE	Observed
		Blinking with equal interval-ABSORPTION STAGE	Observed
		Continuously on-FLOAT STAGE	Observed
	Green /Red /Orange	Equalization mode	Provided
		Green continuously on MANUAL MODE	Observed
		Red continuously on AUTO MODE	Observed
		Green blinking with equal interval-EQUALIZATION ON IN MANUAL MODE	Observed
		Red blinking with equal interval-EQUALIZATION ON IN AUTO MODE	Observed
		Fault Display	Provided
		Orange continuously on WRONG BATTERY SELECTION	Observed
		Orange blinking with equal interval-ARRAY OVER CURRENT	Observed
		Orange blinking with long off time-HIGH TEMPERATURE	Observed
	Red	Continuously on-ARRAY / BATTERY REVERSE POLARITY	Observed

Comments:

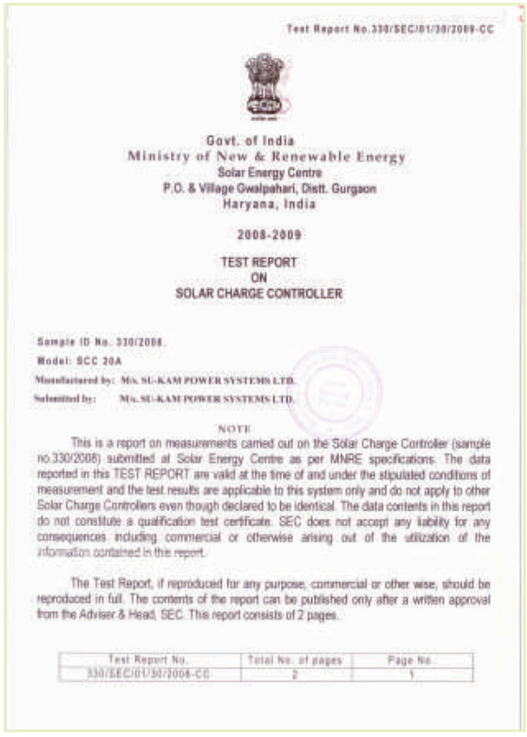
This charge controller found to posses required technical features to be used with PV power plants. It is observed that this charge controller is one of the most powerful charge controller of its capacity range.

Tested by:
1. Mamatha
2. Arun Kumar

Approved by:

Issued by:

Test Report: Solar Charge Controller (40A)



Test Report No.330/SEC/01/30/2009-CC

Govt. of India
Ministry of New & Renewable Energy
Solar Energy Centre
P.O. & Village Gwalpahari, Distt. Gurgaon
Haryana, India

2008-2009

TEST REPORT
ON
SOLAR CHARGE CONTROLLER

Sample ID No. 330/2008.
Model: SCC 20A
Manufactured by: M/s. SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s. SU-KAM POWER SYSTEMS LTD.

NOTE

This is a report on measurements carried out on the Solar Charge Controller (sample no.330/2008) submitted at Solar Energy Centre as per MNRE specifications. The data reported in this TEST REPORT are valid at the time of and under the stipulated conditions of measurement and the test results are applicable to this system only and do not apply to other Solar Charge Controllers even though declared to be identical. The data contents in this report do not constitute a qualification test certificate. SEC does not accept any liability for any consequences including commercial or otherwise arising out of the utilization of the information contained in this report.

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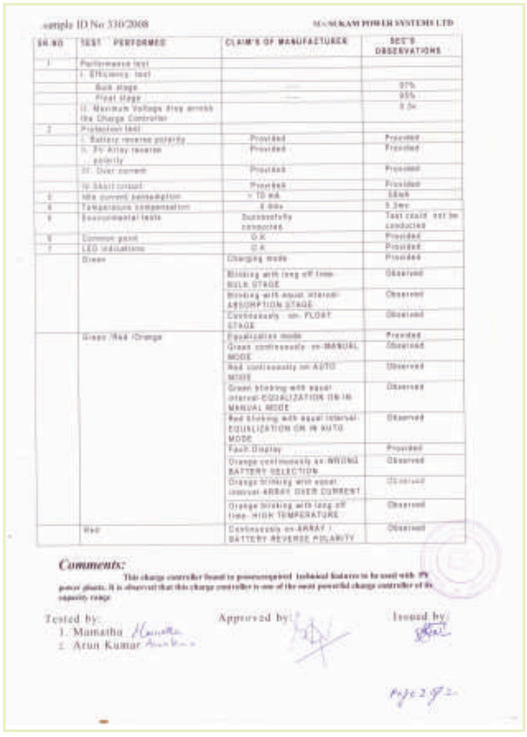
Test Report No.	Total No. of pages	Page No.
330/SEC/01/30/2008-CC	2	1

Test Report: Solar Charge Controller (20A)



sample ID No 330/2008 M/s SUKAM POWER SYSTEMS LTD

SR.NO	TEST PERFORMED	CLAIM'S OF MANUFACTURER	SEC'S OBSERVATIONS
1	Performance test		
	I. Efficiency test		
	Bulk stage	----	97%
	Float stage	----	95%
	II. Maximum Voltage drop across the Charge Controller		0.3v
2	Protection test		
	I. Battery reverse polarity	Provided	Provided
	II. PV Array reverse polarity	Provided	Provided
	III. Over current	Provided	Provided
	IV Short circuit	Provided	Provided
3	Idle current consumption	< 10 mA	8mA
4	Temperature compensation	4 mv	3.9mv
5	Environmental tests	Successfully completed	Test could not be conducted
6	Common point	O.K	Provided
7	LED indications	O.K	Provided
	Green	Charging mode	Provided
		Blinking with long off time BULK STAGE	Observed
		Blinking with equal interval ABSORPTION STAGE	Observed
		Continuously on FLOAT STAGE	Observed
	Green /Red /Orange	Equalization mode	Provided
		Green continuously on MANUAL MODE	Observed
		Red continuously on AUTO MODE	Observed
		Green blinking with equal interval EQUALIZATION ON IN MANUAL MODE	Observed
		Red blinking with equal interval EQUALIZATION ON IN AUTO MODE	Observed
		Fault Display	Provided
		Orange continuously on WRONG BATTERY SELECTION	Observed
		Orange blinking with equal interval ARRAY OVER CURRENT	Observed
		Orange blinking with long off time HIGH TEMPERATURE	Observed
	Red	Continuously on ARRAY / BATTERY REVERSE POLARITY	Observed

Comments:

This charge controller found to possess required technical features to be used with PV power plants. It is observed that this charge controller is one of the most powerful charge controller of its capacity range.

Tested by:
1. Mamatha
2. Arun Kumar

Approved by:

Issued by:

Test Report: Solar Charge Controller (20A)

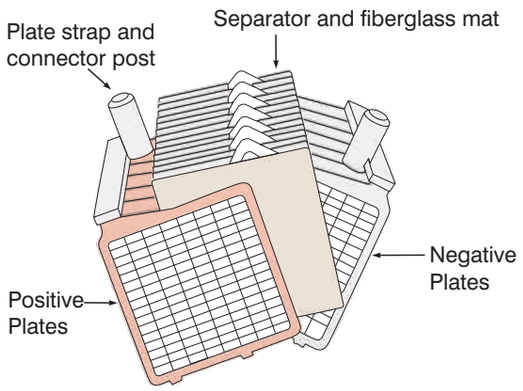
SOLAR BATTERY

Lead acid batteries are commonly used as an energy storage medium for solar backup battery banks. The 'energy' or electron flow is the result of a chemical reaction occurring within the battery between the electrolyte and the lead plates inside the battery.

The amount of solar energy a battery can store and release when needed is limited to the batteries design capacity rating. Batteries are rated according to their voltage, amp hours (AH) of storage and their ability to delivery the stored energy over a given time period, known as the C rating, i.e. C5, C10, C20, C100.

Deep cycle flooded lead acid batteries are commonly used for solar energy storage in stand alone solar power systems. There are different types of deep cycle lead acid batteries designed to suit different applications; these include fully serviceable type lead acid batteries.

The Su-kam solar batteries are specially designed for optimum performance, very long life, high relaiablity, low self discharge and quick charging capability



SOLAR BATTERY

LMLA

20Ah/12V-220Ah

Gel VRLA

40Amps to 150 Amps/12 V
200Amps to 1000 Amps/2V cells

Product Code: BAT-SO-TT-01200-00020, BAT-OT-TT-01200-00040
BAT-SO-TT-01200-00075, BAT-SO-TT-01200-00080
BAT-SO-TT-01200-00100, BAT-SO-LA-01200-00120
BAT-OT-TT-01200-00150, BAT-OT-TT-01200-00200

SOLAR BATTERY - 20Ah/12V-220Ah

A Solar charge controller is used to control the charging current drawn from the solar arrays to the batteries. Su-Kam's Solar Charge Controller is equipped with Micro controller and Digital Signal Processing (DSP) technology and is fully protected against transient over voltage and reverse current flow.

Su-Kam batteries, designed for use with Su-Kam Solar Systems, are built to last longer and are rugged enough to be used in any weather condition.

Homes located in remote areas without access to grid power often depend on off-grid renewable energy systems to satisfy their power requirements. For these solar, wind and hybrid powered systems energy storage plays a critical role in providing uninterrupted power when the sun does not shine or the wind does not blow.

Su-Kam Solar batteries designed at C/10 rating are engineered for the long life requirements of off-grid/hybrid and DC based systems and residential systems. Homeowners can optimize their renewable energy systems and dramatically reduce operating costs when powering their homes in remote areas. Whether homeowners use solar panels, wind turbines, or a combination of different sources in a hybrid system.

Features

Innovative

- Su-Kam Solar batteries are designed at C/10 rating for deep discharge performance
- It has the capacity to sustain partial state of discharge
- The Ah efficiency of the battery >90%; whereas Wh efficiency >= 75% & endurance Test is qualified as per IS 13369:1992

Economical

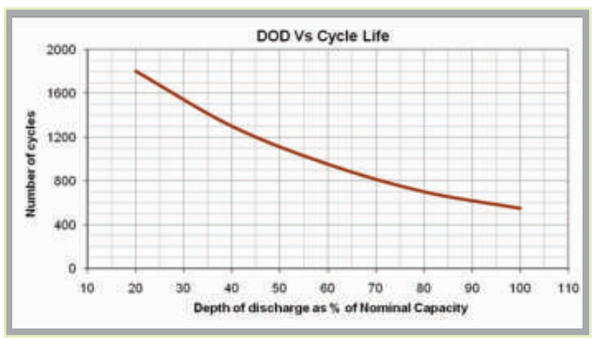
- Operating cost is quite low hence its pocket friendly

Certifications

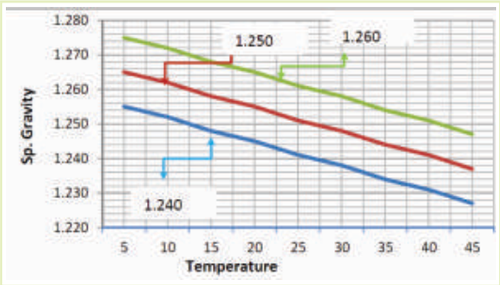
- TUV IS 13369:1992 Certified
- MNRE, Govt. of India approved

Convenient

- Su-Kam Solar batteries need water topping twice a year unlike other batteries which needs atleast 4 or more times

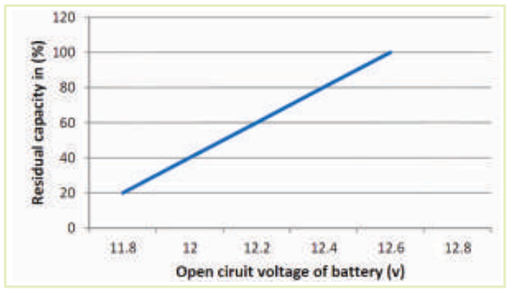


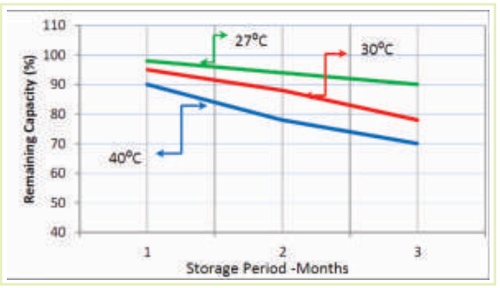
The graph states the life cycle of a battery. The working life of a battery depends upon the discharge rate of battery every time. Partial discharge of the battery leads to greater number of cycles. Deep discharge - 70 to 80% leads to decrease in the working life of the battery.



A non linear relationship exists between Specific gravity of Battery and temperature. The Gravity of the battery decreases with increase in temperature which accelerates the reaction process in the battery. For better performance the battery should be operated at gravity of 1.260 at 25C.

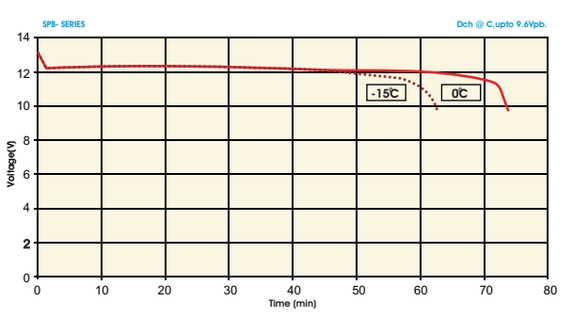
Capacity of the battery is being changed as per the change in the battery OCV. Graph shows the relation between operating voltage and State of charge (SOC) of the battery.



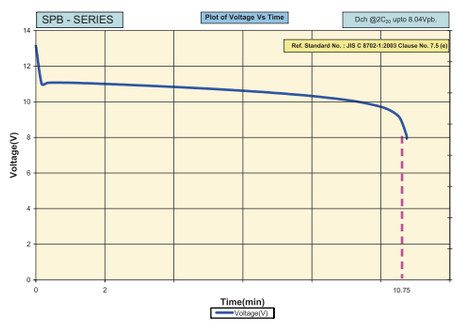


Increase in the temperature accelerates the reaction process in the battery kept idle as a result the battery gets self discharged gradually. The battery should always be kept at a cool place at ideal temp 27C. The battery should be given freshening charge every three months if lying ideal. It is recommended to use the battery within 6 Month of manufacturing for its optimum result and life.

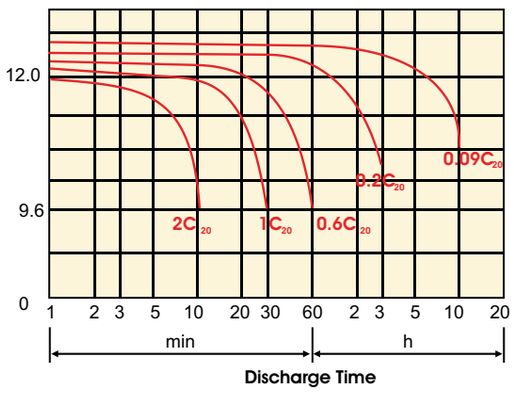
SU-KAM BATTERY - LOW TEMPERATURE CHARACTERISTICS



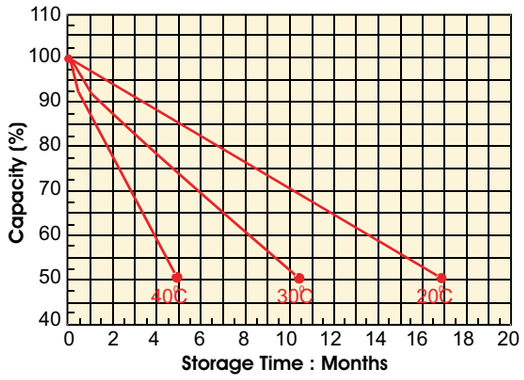
SU-KAM BATTERY - HIGH RATE DISCHARGE CHARACTERISTICS @23°± 2°C



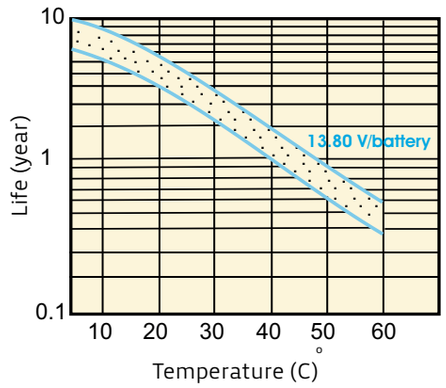
DISCHARGE CURVES CHARACTERISTIC FOR SU-KAM BATTERIES



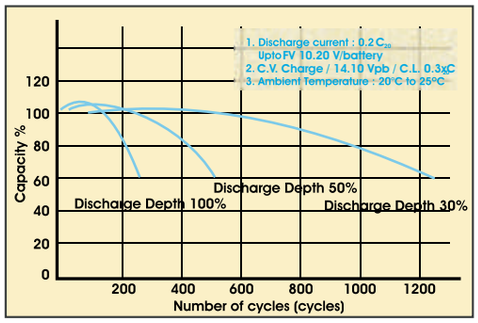
SELF - DISCHARGE CHARACTERISTIC



TEMPERATURE EFFECTS ON FLOAT LIFE



CYCLE CHARACTERISTICS



SOLAR BATTERIES TECHNICAL SPECIFICATION

Physical Parameters	Tolerance	UOM	Battery Type								
			12V/ 20Ah	12V/ 40Ah	12V/ 75Ah	12V/ 80Ah	12V/ 100Ah	12V/ 120Ah	12V/ 120Ah	12V/ 150Ah	12V/ 200 Ah
Length	±3 mm	mm.	258	410	515	515	515	518	503	503	503
Width	±3 mm	mm.	172	175	215	215	215	274	193	193	193
Height[upto LID top]	±2mm	mm.	202	212	212	212	212	248	374	374	374
Height[upto Terminal top]	±2mm	mm.	238	250	250	250	250	286	412	412	412
Weight[DRY]	± 5%	Kg.	10.5	20	24.5	27.4	10.5	36.5	38.7	42.4	52.1
Weight[FILLED]	± 5%	Kg.	15.3	25.6	38	40.5	15.5	58.2	61.5	65	72.5
Marking	N/A	As per IS 13369:1992									
Terminal Post	N/A	Clearly marked									
Electrolyte	N/A	To conform IS 226: 1977									
Electrolyte level indicator	N/A	Present									
Sp. Gr of fully charged battery	N/A	1.240 ± 0.005									
Container Type	N/A		N-50	N-100	N-150	N-150	N-150	Jumbo	IT-500	IT-500	IT-500
Nominal C10 Capacity (Ah) @27°C upto 1.80 VPC	N/A		20	40	75	80	100	120	120	150	200
Loss of capacity during storage	N/A	< 10%									

LEAD ACID BATTERY

POWER BANK SERIES

Product Code: BAT-PB-LA-01224-00100, BAT-PB-LA-01224-00135
BAT-PB-LA-01224-00150, BAT-PB-LA-01224-00165
BAT-SL-LA-01224-00200

POWER BANK SERIES - 50Ah - 220 Ah

A Lead acid battery is an electrical storage device that uses a reversible chemical reaction to store energy. It uses a combination of lead plates or girds and an electrolyte consisting of a diluted sulphuric acid to convert electrical energy into potential chemical energy and back again.

Product Features

- Extra thick plates for excellent discharge performance which increases the battery life
- Extremely pure Lead Oxide for low maintenance and higher shelf life
- Double separation between plates to prevent them from shorting and active material shedding
- Using advances (US) technology for Inter Cell Welding which ensues optimal performance due to low internal resistance
- Micro porous aqua trap vent plug to ensure minimum acid fumes and hence ensures low maintenance of batteries
- Low Antimony alloy reduces electrolysis loss, hence require low maintenance
- Ceramic flame arrestor prevents electrical sparks to go in and therefore ensures highest degree of safety for all domestic and office usage
- Less power consumption during recharging, due to high charge efficiency and low internal resistance (due to low antimony, purest oxide and electrolyte).
- Best engineered product to suit with all types of inverter and UPS products.

Benefits

- Values for money
- Reliable
- Robust, tolerant to rough handling
- Longer life
- Better back-up

Battery Name	Battery Model	Capacity at 27C° Discharged at C20 rate	Dimensions (+/-3mm)			Weight-Kg* (Gross)	Charging Current-Amp	Warranty** (in months)
			Length	Width	Height			
Power Bank-100	SIG 100	100Ah	410	174	244	29.1	10	24
Power Bank-135	SIG 135	135Ah	512	212	245	41.7	13.5	24
Power Bank-150	SPG 150	150Ah	512	212	245	43.7	15	18
Power Bank-150	SIG 150	150Ah	512	212	245	43.7	15	24
Power Bank-165	SIG 165	165Ah	517	274	251	51.8	16	24
Power Bank-200	SIG 200	200Ah	517	274	251	60	20	24

Load	Inverter/ UPS VA Rating	No. of Batteries	BACKUP DURATION (IN HRS. - MIN.)									
			100 Ah		135 Ah		150 Ah		165 Ah		200 Ah	
			Full Load	50% load	Full Load	50% load	Full Load	50% load	Full Load	50% load	Full Load	50% load
1 Tubelight + 3 Fan + 1 TV + 4 CFL	650 VA	1 No.	1h	2h 40m	1h 40m	3h 50m	1h 50m	4h 20m	2h 10m	5h	2h 40m	6h 10m
2 Tubelight + 2 Fan + 1 PC + 3 CFL	650 VA	1 No.	1h	2h 50m	1h 40m	4h	1h 50m	4h 30m	2h 10m	5h 10m	2h 50m	6h 30m
2 Tubelight + 4 Fan + 1 PC + 3 CFL	850 VA	1 No.	40m	1h 50m	1h	2h 40m	1h 10m	3h	1h 30m	3h 30m	1h 50m	4h 20m
2 Tubelight + 4 Fan + 1 TV + 4 CFL	850 VA	1 No.	40m	2h	1h	2h 50m	1h 10m	3h 10m	1h 30m	3h 40m	1h 50m	4h 30m
2 Tubelight + 7 Fan + 1 TV	1500 VA	2 No.(S)	1h	2h 20m	1h 20m	3h 20m	1h 40m	3h 50m	1h 40m	4h 10m	2h 20m	5h 10m
5 Tubelight + 7 Fan + 1 PC + 7 CFL	1500 VA	2 No.(S)	50m	2h 10m	1h 20m	3h 10m	1h 20m	3h 40m	1h 40m	4h 10m	2h 10m	5h 10m

LEAD ACID BATTERY

POWER SUPREME SERIES

Product Code: BAT-SL-LA-01224-00100, BAT-SL-LA-01224-00135
BAT-SL-LA-01224-00150, BAT-SL-LA-01224-00165
BAT-SL-LA-01224-00200

POWER SUPREME SERIES - 50Ah - 220 Ah

A Lead acid battery is an electrical storage device that uses a reversible chemical reaction to store energy. It uses a combination of lead plates or girds and an electrolyte consisting of a diluted sulphuric acid to convert electrical energy into potential chemical energy and back again.

Product Features

- Extra thick plates for excellent discharge performance which increases the battery life
- Extremely pure Lead Oxide for low maintenance and higher shelf life
- Double separation between plates to prevent them from shorting and active material shedding
- Using advances (US) technology for Inter Cell Welding which ensues optimal performance due to low internal resistance
- Micro porous aqua trap vent plug to ensure minimum acid fumes and hence ensures low maintenance of batteries
- Low Antimony alloy reduces electrolysis loss, hence require low maintenance
- Ceramic flame arrestor prevents electrical sparks to go in and therefore ensures highest degree of safety for all domestic and office usage
- Less power consumption during recharging, due to high charge efficiency and low internal resistance (due to low antimony, purest oxide and electrolyte).
- Best engineered product to suit with all types of inverter and UPS products.

Benefits

- Values for money
- Reliable
- Robust, tolerant to rough handling
- Longer life
- Better back-up

Battery Name	Battery Model	Capacity at 27C° Discharged at C20 rate	Dimensions (+/-3mm)			Weight-Kg* (Gross)	Charging Current-Amp	Warranty** (in months)
			Length	Width	Height			
Power Bank-100	SIG 100	100Ah	410	174	244	29.1	10	24
Power Bank-135	SIG 135	135Ah	512	212	245	41.7	13.5	24
Power Bank-150	SPG 150	150Ah	512	212	245	43.7	15	18
Power Bank-150	SIG 150	150Ah	512	212	245	43.7	15	24
Power Bank-165	SIG 165	165Ah	517	274	251	51.8	16	24
Power Bank-200	SIG 200	200Ah	517	274	251	60	20	24

Load	Inverter/ UPS VA Rating	No. of Batteries	BACKUP DURATION (IN HRS. - MIN.)									
			100 Ah		135 Ah		150 Ah		165 Ah		200 Ah	
			Full Load	50% load	Full Load	50% load	Full Load	50% load	Full Load	50% load	Full Load	50% load
1 Tubelight + 3 Fan + 1 TV + 4 CFL	650 VA	1 No.	1h	2h 40m	1h 40m	3h 50m	1h 50m	4h 20m	2h 10m	5h	2h 40m	6h 10m
2 Tubelight + 2 Fan + 1 PC + 3 CFL	650 VA	1 No.	1h	2h 50m	1h 40m	4h	1h 50m	4h 30m	2h 10m	5h 10m	2h 50m	6h 30m
2 Tubelight + 4 Fan + 1 PC + 3 CFL	850 VA	1 No.	40m	1h 50m	1h	2h 40m	1h 10m	3h	1h 30m	3h 30m	1h 50m	4h 20m
2 Tubelight + 4 Fan + 1 TV + 4 CFL	850 VA	1 No.	40m	2h	1h	2h 50m	1h 10m	3h 10m	1h 30m	3h 40m	1h 50m	4h 30m
2 Tubelight + 7 Fan + 1 TV	1500 VA	2 No.(S)	1h	2h 20m	1h 20m	3h 20m	1h 40m	3h 50m	1h 40m	4h 10m	2h 20m	5h 10m
5 Tubelight + 7 Fan + 1 PC + 7 CFL	1500 VA	2 No.(S)	50m	2h 10m	1h 20m	3h 10m	1h 20m	3h 40m	1h 40m	4h 10m	2h 10m	5h 10m

TUBULAR BATTERY

BIG WORRIER SERIES

Product Code: BAT-WR-TT-01248-00150
BAT-WR-TT-01248-00180

BIG WORRIER SERIES - 150Ah, 180Ah

These batteries are perfect for any inverter. One of the highlights of tubular batteries is its long life. The design is more complex and the manufacturing process is more involved then for normal lead acid batteries. If not only uses the latest technology but also offers features like good electrical performance, adequate life, low reserve of lead, low reserve of active material, sensitive to active material, sensitive to active material shedding etc.

Product Features

- Batteries made with high acid volume in each cell.
- Extra thick gauntlets suitable for Indian Climatic condition
- Spines cast at high pressure to ensure minimum corrosion for reliability, extra long life and strength
- DARAMIC separator with high porosity, low electrical resistance and excellent oxidation resistant.
- Micro-porous ceramic vent plugs with float guide indicators
- Extra Thick spines and bus bar
- Leak proof heat Sealed container

Benefits

- Long Shelf Life - Heavy Duty Tubular Plates to give you excellent cyclic life with deep cycle capabilities.
- Low Maintenance – Minimum topping up frequency.
- Excellent performance under extreme temperature conditions.
- Aesthetically designed, low foot print – occupies less space.
- Thick spices for excellent Discharge performance on heavy loads.
- Specially designed vent plugs for minimum acid fumes.
- Float guide indicator - for easy maintenance.
- Suitable for all types of UPS/HUPS and standby application.
- Better thermal stability even for high charge and discharges due to high acid volume.

Backup time :

Battery Name	Battery Model	Capacity at 27C° Discharged at C20 rate	Dimensions (+/-3mm)			Weight-Kg* (Gross)	Charging Current-Amp	Warranty** (in months)
			Length	Width	Height			
Big Warrior-150	SBW 1500	150Ah	503	193	412	61.5	15	48
Big Warrior-180	SBW 1800	180Ah	503	193	412	65	18	48

Load	Inverter/ UPS VA Rating	No. of Batteries	BACKUP DURATION (IN HRS. - MIN.)			
			150 Ah		180 Ah	
			Full Load	50% load	Full Load	50% load
1 Tubelight + 3 Fan + 1 TV + 4 CFL	650 VA	1 No.	2h	4h 40m	2h 30m	5h 40m
2 Tubelight + 2 Fan + 1 PC + 3 CFL	650 VA	1 No.	2h	4h50m	2h 40m	6h 10m
2 Tubelight + 4 Fan + 1 PC + 3 CFL	850 VA	1 No.	1h 20m	3h 20m	1h 40m	4h 0m
2 Tubelight + 4 Fan + 1 TV + 4 CFL	850 VA	1 No.	1h 20m	3h 20m	1h 50m	4h 0m
7 Tubelight + 7 Fan + 1 TV	1500 VA	2 No.(S)	1h 40m	3h 20m	2h 10m	5h
5 Tubelight + 7 Fan + 1 PC + 7 CFL	1500 VA	2 No.(S)	1h 30m	3h 50m	1h 10m	4h 50m

Backup time evaluated under standard test conditions.

TUBULAR BATTERY

BIG CONQUERIOR SERIES

Product Code: BAT-CQ-TT-01248-00150
BAT-CQ-TT-01248-00180

BIG CONQUERIOR SERIES - 150Ah, 180Ah

These batteries are perfect for any inverter. One of the highlights of tubular batteries is its long life. The design is more complex and the manufacturing process is more involved then for normal lead acid batteries. If not only uses the latest technology but also offers features like good electrical performance, adequate life, low reserve of lead, low reserve of active material, sensitive to active material, sensitive to active material shedding etc.

Product Features

- Batteries made with high acid volume in each cell.
- Extra thick gauntlets suitable for Indian Climatic condition
- Spines cast at high pressure to ensure minimum corrosion for reliability, extra long life and strength
- DARAMIC separator with high porosity, low electrical resistance and excellent oxidation resistant.
- Micro-porous ceramic vent plugs with float guide indicators
- Extra Thick spines and bus bar
- Leak proof heat Sealed container

Benefits

- Long Shelf Life - Heavy Duty Tubular Plates to give you excellent cyclic life with deep cycle capabilities.
- Low Maintenance – Minimum topping up frequency.
- Excellent performance under extreme temperature conditions.
- Aesthetically designed, low foot print – occupies less space.
- Thick spices for excellent Discharge performance on heavy loads.
- Specially designed vent plugs for minimum acid fumes.
- Float guide indicator - for easy maintenance.
- Suitable for all types of UPS/HUPS and standby application.
- Better thermal stability even for high charge and discharges due to high acid volume.

Backup time :

Battery Name	Battery Model	Capacity at 27C° Discharged at C20 rate	Dimensions (+/-3mm)			Weight-Kg* (Gross)	Charging Current-Amp	Warranty** (in months)
			Length	Width	Height			
Big Conqueror -150	SBT 1500	150Ah	503	193	412	61.5	15	48
Big Conqueror -180	SBT 1800	180Ah	503	193	412	65	18	48

Load	Inverter/ UPS VA Rating	No. of Batteries	BACKUP DURATION (IN HRS. - MIN.)			
			150 Ah		180 Ah	
			Full Load	50% load	Full Load	50% load
1 Tubelight + 3 Fan + 1 TV + 4 CFL	650 VA	1 No.	2h	4h 40m	2h 30m	5h 40m
2 Tubelight + 2 Fan + 1 PC + 3 CFL	650 VA	1 No.	2h	4h50m	2h 40m	6h 10m
2 Tubelight + 4 Fan + 1 PC + 3 CFL	850 VA	1 No.	1h 20m	3h 20m	1h 40m	4h 0m
2 Tubelight + 4 Fan + 1 TV + 4 CFL	850 VA	1 No.	1h 20m	3h 20m	1h 50m	4h 0m
7 Tubelight + 7 Fan + 1 TV	1500 VA	2 No.(S)	1h 40m	3h 20m	2h 10m	5h
5 Tubelight + 7 Fan + 1 PC + 7 CFL	1500 VA	2 No.(S)	1h 30m	3h 50m	1h 10m	4h 50m

Backup time evaluated under standard test conditions.

TUBULAR BATTERY

BAZOOKA SERIES

Product Code: BAT-ST-TB-01236-00120
BAT-HP-ST-01236-00150
BAT-ST-TB-01236-00180

BAZOOKA SERIES - 120Ah, 150Ah & 180Ah

These batteries are perfect for any inverter. One of the highlights of tubular batteries is its long life. The design is more complex and the manufacturing process is more involved then for normal lead acid batteries. If not only uses the latest technology but also offers features like good electrical performance, adequate life, low reserve of lead, low reserve of active material, sensitive to active material, sensitive to active material shedding etc.

Product Features

- Most compact Tall Tubular battery with global acceptability
- Extra thick gauntlets suitable for Indian Climatic condition
- Extra thick spines cast at high pressure to ensure minimum corrosion for reliability, extra long life and strength
- Leak proof heat Sealed tall PP container
- DARAMIC separator with high porosity, low electrical resistance and excellent oxidation resistant.
- Micro-porous ceramic vent plugs with float guide indicators

Benefits

- Long Shelf Life - Heavy Duty Tubular Plates to give you excellent cyclic life with deep cycle capabilities.
- Excellent performance under extreme temperature conditions.
- Aesthetically designed, low foot print – occupies less space.
- Thick spines for excellent Discharge performance on heavy loads.
- Specially designed vent plugs for minimum acid fumes.
- Float guide indicator - for easy maintenance.
- Suitable for all types of UPS/HUPS and standby application.

Backup time :

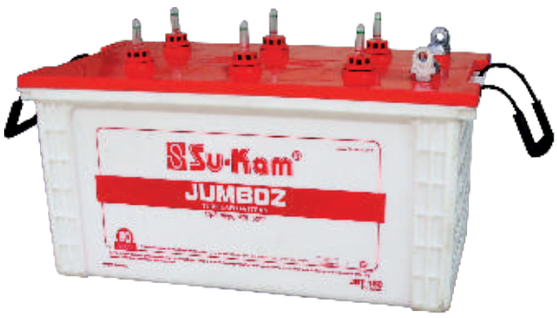
Battery Name	Battery Model	Capacity at 27C° Discharged at C20 rate	Dimensions (+/-3mm)			Weight-Kg* (Gross)	Charging Current-Amp	Warranty** (in months)
			Length	Width	Height			
Bazooka-120	HPT 120	120Ah	503	193	362	52.3	12	36
Bazooka-150	HPT 150	150Ah	503	193	362	57.6	15	36
Bazooka-180	HPT 180	180Ah	503	193	362	61.3	18	36

Load	Inverter/ UPS VA Rating	No. of Batteries	BACKUP DURATION (IN HRS. - MIN.)					
			120 Ah		150 Ah		180 Ah	
			Full Load	50% load	Full Load	50% load	Full Load	50% load
1 Tubelight + 3 Fan + 1 TV + 4 CFL	650 VA	1 No.	1h	3h 30m	2h	4h 40m	2h 30m	5h 40m
2 Tubelight + 2 Fan + 1 PC + 3 CFL	650 VA	1 No.	1h 30m	3h 45m	2h	4h 50m	2h 40m	6h 10m
2 Tubelight + 4 Fan + 1 PC + 3 CFL	850 VA	1 No.	1h	2h 30m	1h 20m	3h 20m	1h 40m	4h 10m
2 Tubelight + 4 Fan + 1 TV + 4 CFL	850 VA	1 No.	1h	2h 40m	1h 20m	3h 20m	1h 50m	4h 10m
7 Tubelight + 7 Fan + 1 TV	1500 VA	2 No.(S)	1h 10m	3h	1h 40m	3h 20m	2h 10m	5h
5 Tubelight + 7 Fan + 1 PC + 7 CFL	1500 VA	2 No.(S)	1h	2h 50m	1h 30m	3h 50m	1h 10m	4h 50m

Backup time evaluated under standard test conditions.

TUBULAR BATTERY

JUMBOZ SERIES



Product Code: BAT-JB-TB-01230-00150

JUMBOZ SERIES - 150Ah

These batteries are perfect for any inverter. One of the highlights of tubular batteries is its long life. The design is more complex and the manufacturing process is more involved then for normal lead acid batteries. If not only uses the latest technology but also offers features like good electrical performance, adequate life, low reserve of lead, low reserve of active material, sensitive to active material, sensitive to active material shedding etc.

Product Features

- Heavy duty tubular plate cast at High Pressure
- Advanced paste with low antimony alloy reduces self discharge
- Low Resistance envelope separator provides low internal resistance and reduces chances of stratification
- Thick spines for enhanced current flow and lesser corrosion

Benefits

- Advanced paste provides long shelf life, reduces water loss and results in minimum maintenance
- Heavy duty spines for excellent cyclic life and deep discharges
- Reliable battery even in high temperature applications
- Provides excellent cyclic life with deep cycle discharges
- Batteries acceptability to sustains even high rate discharges on heavy loads

Battery Name	Battery Model	Capacity at 27C° Discharged at C20 rate	Dimensions (+/-3mm)			Weight-Kg* (Gross)	Charging Current-Amp	Warranty** (in months)
			Length	Width	Height			
Jumboz-150	JBT 150	150 Ah	518	274	286	58.2	15	30

Load	Inverter/UPS VA Rating	No. Of Batteries	BACKUP DURATION (IN HRS. - MIN.) 150 Ah	
			Full Load	50% load
1 Tubelight + 3 Fan + 1 TV + 4 CFL	650 VA	1 No.	1h 50m	4h 40m
2 Tubelight + 2 Fan + 1 PC + 3 CFL	650 VA	1 No.	2h	4h 50m
2 Tubelight + 4 Fan + 1 PC + 3 CFL	850 VA	1 No.	1h 20m	3h 20m
2 Tubelight + 4 Fan + 1 TV + 4 CFL	850 VA	1 No.	1h 20m	3h 20m
7 Tubelight + 7 Fan + 1 TV	1500 VA	2 No.(S)	1h 40m	4h
5 Tubelight + 7 Fan + 1 PC + 7 CFL	1500 VA	2 No.(S)	1h 30m	3h 50m

Backup time evaluated under standard test conditions.

VRLA GEL - 2V/200Ah to 1000Ah

Partial State of Charge

PSOC is a reality of most off-grid and unstable grid Renewable Energy systems. Why? Frequently, solar panels used in these applications are undersized, so batteries are not achieving a full recharge. The same is true with intermittent weather conditions or placement of solar panels in shady areas, which affect a solar installation's ability to collect and store enough energy to fully recharge batteries.

PSOC is also common in inverter backup systems. Batteries are often used when the grid goes down. However, the grid is also the main charging source for batteries. In many regions of the world, the grid goes down several times a day, or is only available a few hours a day, so deep-cycle batteries are not being fully recharged on a regular basis, resulting in diminished life of the battery. Telecom applications which operate off-grid, rely on an unstable grid, or depend on a hybrid RE/battery system for power face the same PSOC issues as does solar. The same is true for telecom applications that are powered by diesel generators, which also serve as the main charging sources for a telecom solution's battery backup system. In many diesel generator installations, the system is often set up to purposely not bring the deep-cycle batteries to a full SOC on a daily basis in order to save money on fuel costs, once again resulting in batteries operating in PSOC conditions.

Features

Unique Positive Plate

- Unique Grid design employs minimum number of nodes, thereby drastically reducing the grid corrosion, resulting enhanced life.
- Proprietary Grid alloy composition with high tin composition improves the positive grid corrosion resistance.
- This results in low rate of positive plate growth and also helps in attaining good deep discharge recovery characteristics.

High Performance Paste Composition

- Proprietary Positive paste composition enhances not only high rate performance but also improves deep discharge recovery and cyclic life.

Uniform Stack Compression

- Use of Plastic compression pads on both sides of stack ensures uniform and desired pressure. This results in rigid construction and prevents bulging of the stack in addition to optimum utilization of active material.

Leak Proof Sealing

- Rubber sealing employed between terminal post and lead bush ensures no electrolyte leak.

High Impact Jar Construction

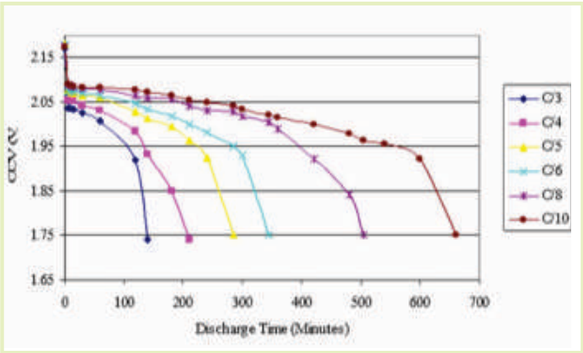
- Vertical ribs on the jar provide extra strength and facilitate air circulation between cells, resulting in uniform performance and life.

Cover Design

- Withstands impacts Locating ring on the cover provides increased mating with jar.

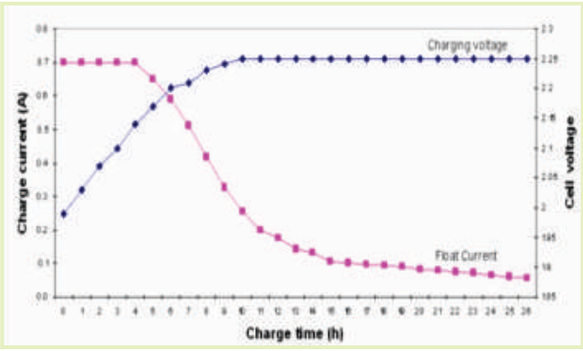
Advanced Module Construction

- Epoxy Powder coated mild steel trays are fabricated with specialized rubber pads to offer cushion to the cells to withstand rigors of transportation and on-site handling practices.



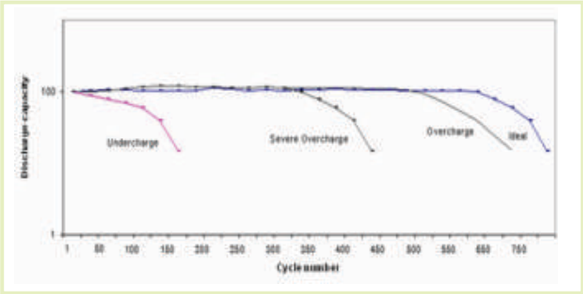
Discharge Characteristics at Various Discharge Level

During discharge the voltage of the battery decreases. The graph here illustrates the decrease in voltage of each cell during discharge at respective discharge current ratings. For e.g c/5 – the line graph shows the backup in minutes provided by the battery when discharged at c/5 rate. Here c/5 is the capacity of the battery



2v Battery Charging Graph

The graph shows the voltage and current characteristics of the battery over time during charging. As the battery attains voltage during charging, the current acceptability of the battery decreases at this stage the battery is completely charged.



2V Battery - Cyclic Charging

The life of the battery also depends on the charger characteristics applied to the battery. Battery charger used for charging should always be 10% of the battery capacity. A charger higher or lower in amp rating will affect the performance of the battery.

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S. No.	Model No.	Capacity C_{10} in Ah	Dimensions of Monobloc Container in mm	No of plates used in one cell.	Dimensions of plates used in cell in mm
5	STB 1200	120	503 (L) x 193(W) x 412(H)	3 TP50 and 4 TN50	TP50 = 144(W) x 245(H) x 8.1(T) TN50 = 142(W) x 238(H) x 3.4(T)
6	STBJ 1200	120	518 (L) x 274(W) x 286(H)	5 TP30 and 6 TN30	TP30 = 144(W) x 152(H) x 8.1(T) TN30 = 142(W) x 159(H) x 3.4(T)
7	STB 1500	150	503 (L) x 193(W) x 412(H)	3 TP60 and 4 TN60	TP60 = 144(W) x 275(H) x 8.1(T) TN60 = 142(W) x 268(H) x 3.4(T)

As per the use of dimensions of the positive and negatives plates, we select four batteries for the endurance test with model no. STB 40, STB 80, STB 1200 and STB 1500.

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Test item particulars	: Solar Batteries
Possible test case verdicts:	
- test case does not apply to the test object	: N/A
- test object does meet the requirement	: P (Pass)
- test object does not meet the requirement	: F (Fail)
Testing	:
Date of receipt of test item	: 2012-02-22
Date (s) of performance of tests	: 2012-02-22 to 2012-06-04
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.	
Name and address of factory (ies)	: Su-Kam Power Systems Limited Plot No. 7, Apparel Park cum Industrial Area, Katha, Baddi, Solan District, Himachal Pradesh – 173205
General product information:	
All the batteries offered are made of same material and 12 V each. For detail information, please refer below table:-	

S. No.	Model No.	Capacity C_{10} in Ah	Dimensions of Monobloc Container in mm	No of plates used in one cell.	Dimensions of plates used in cell in mm
1	STB 20	20	256 (L) x 172(W) x 236(H)	1 TP25 and 2 TN25	TP25 = 144(W) x 137(H) x 8.1(T) TN25 = 142(W) x 144(H) x 3.4(T)
2	STB 40	40	410 (L) x 175(W) x 250(H)	2 TP25 and 3 TN25	TP25 = 144(W) x 137(H) x 8.1(T) TN25 = 142(W) x 144(H) x 3.4(T)
3	STB 75	75	515 (L) x 215(W) x 250(H)	3 TP30 and 4 TN30	TP30 = 144(W) x 152(H) x 8.1(T) TN30 = 142(W) x 159(H) x 3.4(T)
4	STB 80	80	515 (L) x 215(W) x 250(H)	4 TP25 and 5 TN25	TP25 = 144(W) x 137(H) x 8.1(T) TN25 = 142(W) x 144(H) x 3.4(T)

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List of Equipments Used

S. No.	Name of Equipment	Make	Equipment S. No.	Calibration due on
1	Life Cycle tester	Associated Powercon	LCT 202 Ckt 1	23.05.2013
2	Life Cycle tester	Associated Powercon	LCT 202 Ckt 2	23.05.2013
3	Life Cycle tester	Associated Powercon	LCT 201 Ckt 1	23.05.2013
4	Life Cycle tester	Associated Powercon	LCT 201 Ckt 2	23.05.2013
5	Water bath	Popular traders	—	09.11.2012
6	Clamp meter	Fluke	Fluke 336	11.09.2012
7	Hydrometer	Thinson, Mysore	—	25.05.2013
8	Steel Scale	Omega	—	—

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TABLE NO. 3 STORAGE TEST

S. No.	Model No.	Sample no.	Initial capacity C (C_{10}) in Ah	Final capacity C* (C_{10}) after storage of 28 days in Ah	Deviation ((C- C*)*100)/C
1	STB20	1	28.00	26.87	4.04
		2	20.10	26.05	-29.60
2	STB40	1	49.46	45.13	8.79
		2	54.07	53.34	1.36
3	STB75	1	79.26	85.69	-8.11
		2	79.61	89.77	-12.76
4	STB80	1	85.23	91.49	-7.34
		2	91.47	93.52	-2.24
5	STB1200	1	140.34	157.69	-12.36
		2	153.72	178.32	-16.00
6	STBJ1200	1	146.21	140.21	4.10
		2	156.35	148.21	5.21
7	STB1500	1	185.76	191.49	-3.08
		2	178.23	169.21	5.06

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Produkte / Products

Prüfbericht - Nr.: 02100031 001 / Test Report No.: Seite 1 von 35 / Page 1 of 35

Auftraggeber / Client: Su-Kam Power Systems Limited, 54, Udyog Vihar, Phase-5, Sector- 37, Gurgaon (Haryana), India

Gegenstand der Prüfung / Test item: Solar tubular Batteries

Bezeichnung / Identification: Please refer below. Serien-Nr. / Serial No.: Engineering samples

Wareneingangs-Nr. / Receipt No.: 1403018362 Eingangsdatum / Date of receipt: 22nd Feb. 2012

Prüfort / Testing location: Su-Kam Power Systems Limited, Plot No. 7, Apparel Park cum Industrial Area, Katha, Baddi, Solan District, Himachal Pradesh – 173205

Prüfgrundlage / Test specification: IS 13369 : 1992

Prüfergebnis / Test Result: Der Prüfgegenstands entspricht oben genannter Prüfgrundlage(n). / The test items passed the test specification(s).

Prüflaboratorium / Testing Laboratory: TÜV Rheinland (India) Pvt. Ltd., 82/A West Wing, 3rd Main Road, Electronic City Phase I, Bangalore-560 100, India

geprüft/ tested by: 20th Jun. 2012 Sandeep Vats (Datum/Date, Name/Stellung/Name/Position, Unterschrift/Signature)

kontrolliert/ reviewed by: 20th Jun. 2012 Rajesh Gupta (Datum/Date, Name/Stellung/Name/Position, Unterschrift/Signature)

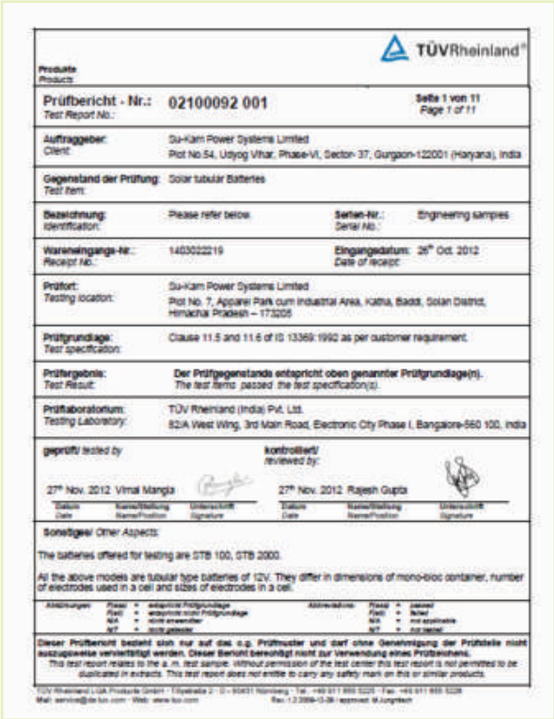
Sonstiges/ Other Aspects:

The batteries offered for testing are STB 20, STB 40, STB 75, STB 80, STB 120, STBJ 120 and STB 150.

All the above models are tubular type batteries of 12V. They differ in dimensions of mono-bloc container, number of electrodes used in a cell and sizes of electrodes in a cell.

Abkürzungen: P(ass) = entspricht Prüfgrundlage; F(ail) = entspricht nicht Prüfgrundlage; N/A = nicht anwendbar; N/T = nicht getestet. Abbreviations: P(ass) = passed; F(ail) = failed; N/A = not applicable; N/T = not tested.

TÜV Rheinland LGA Products GmbH · Tillystraße 2 · D - 90431 Nürnberg · Tel.: +49 911 655 5225 · Fax: +49 911 655 5226
Mail: service@de.tuv.com · Web: www.tuv.com Rev. 1.2 2009-12-28 / approved: M.Jungbeck



Produkte
Products

TÜVRheinland®

Prüfbericht - Nr.: 02100092 001
Test Report No.:

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Page 1 of 11

Auftraggeber: Su-Kam Power Systems Limited
Client: Plot No.54, Udyog Vihar, Phase-VI, Sector- 37, Gurgaon-122001 (Haryana), India

Gegenstand der Prüfung: Solar tubular Batteries
Test item:

Bezeichnung: Please refer below. Serien-Nr.: Engineering samples
Identification: Serial No.:

Wareneingangs-Nr.: 1403022219 Eingangsdatum: 26th Oct. 2012
Receipt No.: Date of receipt:

Prüfort: Su-Kam Power Systems Limited
Testing location: Plot No. 7, Apparel Park cum Industrial Area, Katha, Baddi, Solan District, Himachal Pradesh – 173205

Prüfgrundlage: Clause 11.5 and 11.6 of IS 13369: 1992 as per customer requirement.
Test specification:

Prüfergebnis: Der Prüfgegenstands entspricht oben genannter Prüfgrundlage(n).
Test Result: The test items passed the test specification(s).

Prüflaboratorium: TÜV Rheinland (India) Pvt. Ltd.
Testing Laboratory: 82/A West Wing, 3rd Main Road, Electronic City Phase I, Bangalore-560 100, India

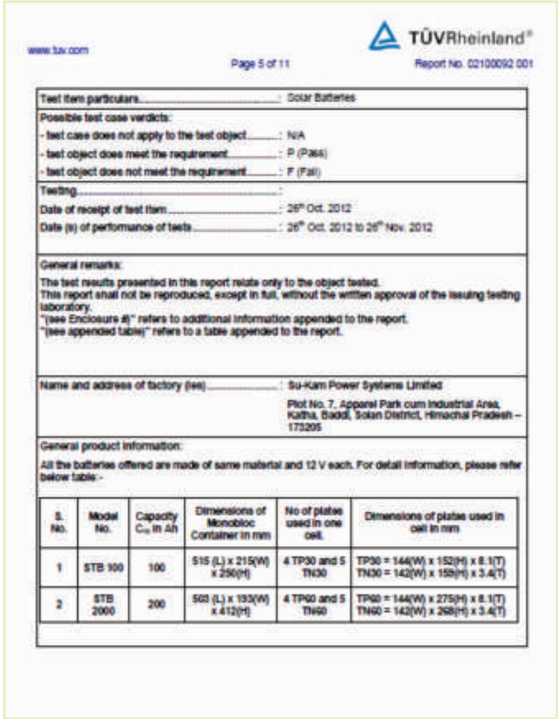
geprüft/ tested by: 27th Nov. 2012 Vimal Mangla
kontrolliert/ reviewed by: 27th Nov. 2012 Rajesh Gupta

Sonstiges/ Other Aspects:

The batteries offered for testing are STB 100, STB 2000.

All the above models are tubular type batteries of 12V. They differ in dimensions of mono-bloc container, number of electrodes used in a cell and sizes of electrodes in a cell.

Diese Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.



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Report No. 02100092 001

Test item particulars: Solar Batteries

Possible test case verdicts:
- test case does not apply to the test object: N/A
- test object does meet the requirement: P (Pass)
- test object does not meet the requirement: F (Fail)

Testing:
Date of receipt of test item: 26th Oct. 2012
Date (s) of performance of tests: 26th Oct. 2012 to 26th Nov. 2012

General remarks:
The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Name and address of factory (ies): Su-Kam Power Systems Limited
Plot No. 7, Apparel Park cum Industrial Area, Katha, Baddi, Solan District, Himachal Pradesh – 173205

General product information:
All the batteries offered are made of same material and 12 V each. For detail information, please refer below table:-

S. No.	Model No.	Capacity C_{10} in Ah	Dimensions of Monobloc Container in mm	No of plates used in one cell.	Dimensions of plates used in cell in mm
1	STB 100	100	515 (L) x 215(W) x 256(H)	4 TP30 and 5 TN30	TP30 = 144(W) x 152(H) x 8.1(T) TN30 = 142(W) x 150(H) x 3.4(T)
2	STB 2000	200	503 (L) x 193(W) x 412(H)	4 TP60 and 5 TN60	TP60 = 144(W) x 275(H) x 8.1(T) TN60 = 142(W) x 268(H) x 3.4(T)

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Report No. 02100092 001

TABLE NO. 2	STORAGE TEST				P
S. No.	Model No.	Sample no.	Initial capacity C (C_{10}) in Ah	Final capacity C' (C_{10}) after storage of 28 days in Ah	Deviation ((C- C')*100)/C
1	STB 100	1	116.33	112.00	3.72
		2	112.83	110.00	2.51
2	STB 2000	1	225.16	220.66	2.00
		2	226.33	220.00	2.80

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Attachment 2 - List of Equipments used

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Page 1 of 1

Report No. 02100092 001

S. No.	Name of Equipment	Make	Equipment S. No.	Calibration due on
1	Life Cycle tester	Associated Powercon	LCT 202 Ckt.1	23.05.2013
2	Life Cycle tester	Associated Powercon	LCT 202 Ckt.2	23.05.2013
3	Life Cycle tester	Associated Powercon	LCT 201 Ckt.1	23.05.2013
4	Life Cycle tester	Associated Powercon	LCT 201 Ckt.2	23.05.2013
5	Clamp meter	Fluke	Fluke 336	30.07.2013
6	Hydrometer	Thimson, Mysore	----	25.05.2013
7	Steel Scale	Omega	----	----

Government of India
Copyright Office
Extracts from Register of Copyrights

Dated: 22-05-2012

1.	Registration No	A-82121/2012
2.	Name,address and nationality of the applicant:	SU-KAM POWER SYSTEMS LTD 306, KIRTI DEEPBUILDING NANGAL RAYA, NEW DELHI - 110046 INDIAN
3.	Nature of applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	ARTISTIC
5.	Title of the work:	PCB LAYOUT OF BATTERY EQUALIZER
6.	Language of the work:	ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease:	SANJEEV KUMAR SAINI 306, KIRTI DEEPBUILDING NANGAL RAYA, NEW DELHI - 110046 INDIAN
8.	Whether the work is published or unpublished:	UNPUBLISHED
9.	Year and country of the first publication and name, address and nationality of the publisher:	NIL
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers:	NIL
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any:	SAME AS COL-2 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright:	-N.A.
13.	If the work is an Artistic work, the location of the original work, including name, address and nationality of the person in possession of it. (In the case of an architectural work, the year of completion of the work should also be shown)	NIL
14.	Remarks:	A SEALED COPY OF THE WORK IS RETURNED AND ANOTHER SEALED COPY IS KEPT.

Diary No. 8527/2010-CO/A
Date of Application: 30-07-2010
Date of Receipt: 04-08-2010

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: PCB layout of Battery Equalizer

Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 12/04/2013

1.	Registration Number	SW-7106/2013
2.	Name, address and nationality of the applicant	SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3.	Nature of the applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	COMPUTER SOFTWARE WORK
5.	Title of the work	BATTERY MONITOR
6.	Language of the work	VISUAL BASIC
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SU-KAM POWER SYSTEMS LTD. , 306, KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A.
13.	If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown).	N.A.
14.	Remarks, if any	

Diary Number : 2883/2011-CO/L
Date of Application : 17/03/2011
Date of Receipt : 17/03/2011

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: Battery Monitor

ORIGINAL

No. 0438

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No.	224606
Date	07/09/2009
Reciprocity Date*	00:00:00
Country	

Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 12-02 in respect of the application of such design to BATTERY TROLLY in the name of SU-KAM POWER SYSTEMS LTD PLOT NO. WZ-1001/2, NANGAL RAYA, NEW DELHI-110046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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*The reciprocity date (if any) which has been allowed and the name of the country
Copyright in the design will subsist for ten years from the date of Registration, and may underthe terms of the Act and Rules, be extended for a further period of five years.
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DR. I. BANERJEE,
C/O. L. S. DAVAR & CO., PATENT & TRADE MARK
ATTORNEYS 32 RADHA MADHAB DUTTA
GARDEN LANE KOLKATA -7000 10

Date of Issue 04/03/2010 11:53:19
SP

Patent: Battery Trollery
Design No: 224506

Government Of India
Copyright Office
Extract from the Register of Copyrights

Dated : 15/3/2013

1.	Registration Number	L-67613/2013
2.	Name, address and nationality of the applicant	SU- KAM POWER SYSTEMS LTD. , 306 ,KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
3.	Nature of the applicant's interest in the copyright of the work	OWNER
4.	Class and description of the work	LITERARY/ DRAMATIC WORK
5.	Title of the work	BATTERY CHARGER MONITORING SOFTWARE
6.	Language of the work	ENGLISH
7.	Name, address and nationality of the author and if the author is deceased, date of his decease	SANJEEV KUMAR SAINI , 306 ,KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
8.	Whether the work is published or unpublished	UNPUBLISHED
9.	Year and country of first publication and name, address and nationality of the publisher	N.A.
10.	Years and countries of subsequent publications, if any, and names, addresses and nationalities of the publishers	N.A.
11.	Names, addresses and nationalities of the owners of various rights comprising the copyright in the work and the extent of rights held by each, together with particulars of assignments and licences, if any	SU- KAM POWER SYSTEMS LTD. , 306 ,KIRTI DEEP BUILDING, NANGAL RAYA, NEW DELHI-110046 INDIAN
12.	Names, addresses and nationalities of other persons, if any, authorised to assign or licence of rights comprising the copyright	N.A.
13.	If the work is an 'Artistic work', the location of the original work, including name, address and nationality of the person in possession of the work. (In the case of an architectural work, the year of completion of the work should also be shown).	N.A.
14.	Remarks, if any	

Diary Number : 5495/2011-CO/L
Date of Application : 23/04/2011
Date of Receipt : 23/04/2011

DEPUTY REGISTRAR OF COPYRIGHTS

Copyright: Battery Charger - Monitoring Software

ORIGINAL

No. 10019

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217400
Date 28TH JULY 2008
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-03 in respect of the application of such design to "BATTERY COVER" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
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L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
17TH MAY 2009

S.P.

Patent: Battery Cover
Design No: 217409

ORIGINAL

No. 1495

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 220665
Date 6TH JAN. 2009
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to "BATTERY" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

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DR. I. BANERJEE,
L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
21ST AUG. 2009

D.B.

Patent: Batteries
Design No 236065

ORIGINAL

No. 9882

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217401
Date 28TH JULY 2008
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to "BATTERY EQUALIZER" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

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Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
This Certificate is not for use in legal proceedings or for obtaining registration abroad.

L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

Date of issue
21ST MAY 2009

Patent: Battery Equalizer
Design No: 217401

ORIGINAL

No. 12951

GOVERNMENT OF INDIA
THE PATENT OFFICE
CERTIFICATE OF REGISTRATION OF DESIGN

Design No. 217402
Date 28TH JULY 2008
Reciprocity date*
Country

Certified that the Design of which a copy is annexed hereto has been registered as of the number and date given above in class 13-02 in respect of the application of such design to "BATTERY TERMINAL PROTECTOR" in the name of

SU-KAM POWER SYSTEMS LTD., PLOT NO.WZ-1401/2, NANGAL RAYA, NEW DELHI-110 046, INDIA, AN INDIAN COMPANY.

in pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

Controller General of Patents, Designs and Trade Marks

*The reciprocity date (if any) which has been allowed and the name of the country.
Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years.
This Certificate is not for use in legal proceedings or for obtaining registration abroad.

L. S. DAVAR & CO.
32, RADHA MADHAB DUTTA GARDEN LANE,
KOLKATA-700010.

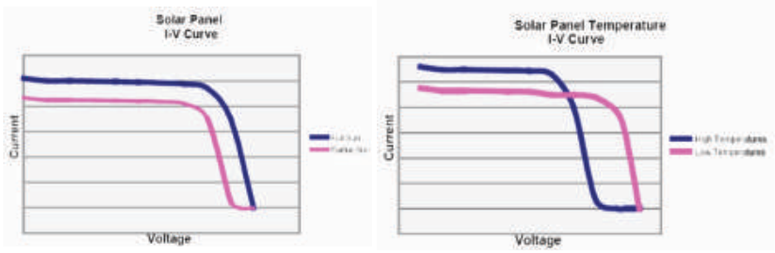
Date of issue
28TH APR. 2009

Patent: Batery Terminal Protector
Design No: 217402

SOLAR PANELS

What is a Solar Panel?

Solar panels are devices that convert light into electricity. A solar panel is a collection of small solar cells spread over a large plate. These cells work together to generate power that can be used for different purposes. The more light rays hits a cell, the more electricity is produced, so solar power systems are usually designed with solar panels facing the Sun for capturing optimum energy in order to generate optimum electricity.

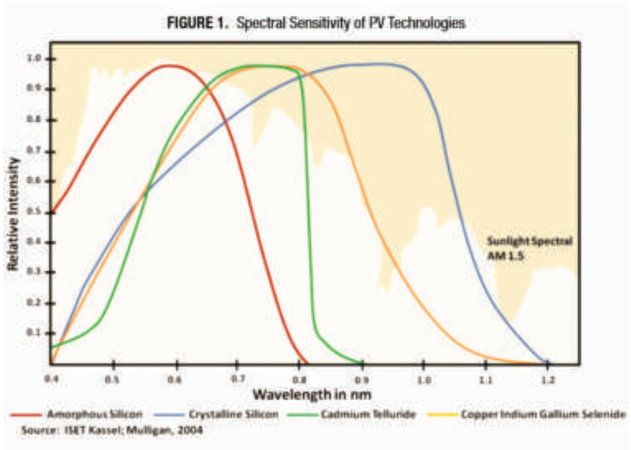


How does it work/ basic mechanism?

For off-grid applications, the most commonly used cells are crystalline silicon. One of the features of crystalline silicon is that its spectral response curve shows that it is most responsive to the infrared spectrum of light. Direct sunlight is needed for crystalline silicon solar modules to be most effective.

As mentioned earlier, a module or a solar panel is a group of photovoltaic cells connected electrically and packaged into a frame. They are made up of special materials called semiconductors such as Mono crystalline silicon and are powered by high-end materials like TEDLAR, crane glass & EVA lamination. Basically, when light strikes the cell, a certain portion of it is absorbed within the semiconductor material. And, the energy of the absorbed light is transferred to the semiconductor. The energy knocks electrons loose, allowing them to flow freely towards the storage device.

Solar panels have a characteristic I-V curve which varies depending upon irradiance and temperature. Short circuit current (Isc) and open circuit voltage (Voc) are key operating points.There is a point on the IV curve where the panel will be generating maximum power, this is called maximum power point voltage (Vmp) or maximum power point current (Imp).



Monocrystal Silicon

To create silicon in a single-crystal state, high-purity silicon must first be melted. It is then reformed or solidified slowly while in contact with a single crystal "seed." The silicon adapts to the pattern of the single-crystal seed as it cools and gradually solidifies. Not surprisingly, because it starts from a seed, this process is called "growing" a new rod (often called a boule) of single-crystal silicon out of molten silicon.

Multicrystalline Silicon

Multi crystalline silicon devices are generally less efficient than those of single-crystal silicon, but they can be less expensive.

Multi crystalline silicon can be produced a variety of ways. The most popular commercial methods involve a process in which molten silicon is directly cast into a mold and allowed to solidify into an ingot. The starting material can be a refined lower-grade silicon rather that the higher-grade semiconductor grade required for single-crystal material. The cooling rate is one factor that determines the final size of crystals in the ingot and the distribution of impurities. The mould is usually square, which produces an ingot that can be cut and sliced into square cells that fit more compactly into a PV module.

Amorphous Silicon

Amorphous solids, such as common glass, are materials whose atoms are not arranged in any particular order. They do not form crystalline structures at all, and they contain large numbers of structural and bonding defects. But they have some economic advantages over other materials that make them appealing for use in PV systems.

How to size a solar panel for a given application?

There are a number of realities that must be considered. Nameplate ratings are at test conditions, which are ideal in many ways. Unless the system is designed to track the sun across the sky, maximum energy will not be harvested. Is the system pointed at the sun at all? Is it shaded at times? Is it far north? Is it possible the solar modules may get dirty frequently? Is it located in a region where it is often cloudy? Is there access to direct sunlight, or indoor light? All of these factors can significantly impact the amount of energy harvested by a solar module. What is really needed is to calculate a budget for the amount of power required by the application, and the amount of power that can realistically be produced by the solar module given the location and condition of the module.

What is really needed is to calculate a budget for the amount of power required by the application, and the amount of power that can realistically be produced by the solar module given the location and condition of the module.

Power vs. Voltage vs. Batteries

One last thing to evaluate when choosing solar modules is the voltage required to charge the batteries. As already shown, there are a number of ICs designed to maximize power from solar modules, and to charge batteries of various chemistries. These devices typically use either buck (input voltage is higher than output voltage), or boost (input voltage is always lower than output voltage) topologies. In choosing a solar module (or a conversion IC), this is an important consideration.

Solar is an abundant, free energy source for charging battery powered applications, however solar modules must be carefully selected and managed in order to harvest the maximum amount of energy possible.

SOLAR PANELS

12 V PV models

10Wp, 20Wp, 40Wp, 50Wp, 75Wp,
80Wp, 100Wp, 125Wp, 150Wp

24 V PV models

150Wp,250Wp

Solar Panels

Product Code: INT-SP-OT-00000-00025, INT-SP-OT-00000-00014
INT-SP-OT-00000-00026, INT-SP-OT-00000-00017
INT-SP-OT-00000-00021, INT-SP-OT-00000-00065
INT-SP-OT-00000-00022, INT-SP-OT-00000-00024
INT-SP-OT-00000-00029, INT-SP-OT-00000-00107

Solar panels are devices that convert light into electricity. A solar panel is a collection of small solar cells spread over a large plate. These cells work together to generate power that can be used for different purposes. The more light rays hits a cell, the more electricity is produced, so solar power systems are usually designed with solar panels facing the Sun for capturing optimum energy in order to generate optimum electricity.

The modules are specifically designed to generate optimum energy from sunlight while withstanding the roughest of conditions in a variety of applications (residential/ commercial and industrial)

Working principle

When light strikes the cell, a certain portion of it is absorbed within the semiconductor material. And, the energy of the absorbed light is transferred to the semiconductor. The energy knocks electrons loose, allowing them to flow freely towards the storage device.

Applications

• Domestic lighting systems • Street Lighting • Water pumping • Battery charging • Community TV system • Microwave repeater station • Railway signaling and lighting systems • Rural radio phones and exchanges • Offshore platforms • Desalination Plants • Portable lantern • Power pack for village electrification • Crop sprayer • Sign boards & glow signs

Features

- Monocrystalline / polycyrstalline silicon solar cells connected in series.
- Powered by TEDLAR, crane glass & EVA lamination, Back sheet ensure robustness, rigidity and high performance
- Solar cells laminated between UV resistant polymer (EVA) and high transmission toughened glass surface.
- Rugged weather-proof nylon terminal box for output connections.
- Anodized Aluminum frame for structural support and shock resistance.
- Trusted & tested for stringent quality standards
- Lowest Yearly Degradation Rate
- Government incentives
- Mechanical Load Test
- Bypass Diode Thermal Test

Certifications

- IEC 61215 standards
- IEC 61730-1
- IEC 61730-2
- IEC 60904-1
- CE Certified
- MNRE, Govt of India approved

Quality and reliability tests

- Outdoor test for energy yield
- Electroluminescence
- IR Thermography
- Reliability test for junction box
- Damp heat test
- Thermal cycling humidity freeze
- Hot spot test
- Low Irradiance test
- STC & NOCT performance
- UV
- Outdoor exposure
- Dry Hipot
- Insulation Resistance
- Wet Leakage Current
- Bypass Diode Thermal Test

TECHNICAL SPECIFICATIONS

Max. Power Pmp (W)	10W	20W	40W	50W	75W	80W	100W	125W	150W	250W
Power Tolerance (+/-)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Max. Power Voltage Vmp (V)	16.85	16.95	17.15	17.25	16.92	17	18	18.15	18.25	30.72
Max. Power Current Imp (A)	0.59	1.18	2.33	2.9	4.43	4.71	5.56	6.89	8.22	8.14
Open Circuit Voltage Voc (V)	20.9	21	21.2	21.3	21.82	22.18	22.3	22.4	22.5	37.8
Short Circuit Current Isc (A)	0.65	1.29	2.55	3.17	4.92	5.11	6.1	7.4	8.85	8.63
Max. System Voltage VDC	600	600	600	600	600	600	1000/600	1000/600	1000/600	1000
Pm Temperature Coefficient (%/K)	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.43
Isc Temperature Coefficient (mA/K)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	0.04
Voc Temperature Coefficient (mV/K)	-2	-2	-2	-2	-2	-2	-2	-2	-2	-0.32
NOCT-Nominal operating cell temp. (Celsius)	45	45	45	45	45	45	45	45	45	45

Note :

The above specifications pertain to the standard branded SPV Module. It can also supply SPV Modules of different ratings to meet specific technical requirements.

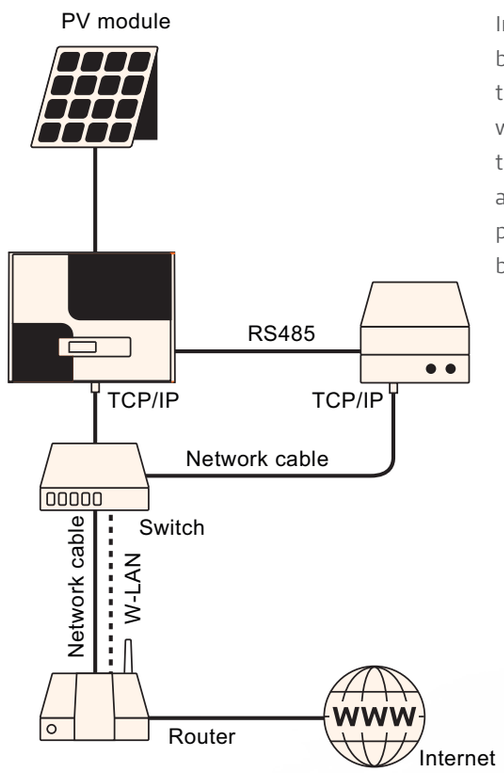
Electrical specifications mentioned above are at standard test conditions as follows [a] light spectrum of AM 1.5 [b] an irradiation of 1,000 Watts per square meter and [c] a cell temperature of 25 degrees Centigrade. Normal production tolerance of +/- 5%

Due to continuous process innovations, the modules supplied may differ from those specified above.

SOLAR NET MONITORING SYSTEM

A stand-alone solar PV system for a home or office works independent from the public electricity grid and this is an advantage for areas where the grid is not available or not reliable. The disadvantages of a stand-alone system are that batteries typically last only five years and that the overall system efficiency is low compared with a grid-interactive system. Another challenge with stand-alone systems is that there may be under-utilisation of the available solar energy when the batteries are full and there is insufficient load or there may be shortage of energy during cloudy days.

Remote monitoring allows you to track important changes to your hardware without requiring a field visit, thus saving time and money. India and much of Africa has many off grid and installations with battery storage and some form of solar.Usually, qualified service technicians need to travel long distances to reach these installations whenever there is a problem. Using RMS and a communication port, technicians can access the sites over RJ 485,GPRS or 3G if available and can troubleshoot the likely cause before travelling. Typically, problems are associated with incorrect charging or discharging of battery packs, and this data is not known before installing a data



logger and understanding the charge and discharge profiles.

The information that the Remote monitoring Software system gives helps us to improve system configuration and system usage. When the Remote monitoring SOftware relay system is released in the near future, loads can be switched on or off based on the charging state of the battery and loads can be added to absorb surplus solar energy that is available. In stand-alone systems that are located in buildings with grid supply, the Remote monitoring Software can trigger a grid charge of the batteries to complement solar energy charging on cloudy days or on days with higher than average consumption.

Monitoring and control of remote solar sites are become a necessity of operation and maintenance of remote sites. Customer must ensure that all the subsystems are efficiently run so that not only there are no power outages. For this purpose a reliable mechanism for remote control and monitoring is provided for Su-Kam built solar systems. The Solar NMS offers one such reliable and efficient system for remote monitoring and control of the solar site and its component. This keeps the status of remote solar PCUs available on RS232, Ethernet & GSM/GPRS platform. The software manages multiple solar devices by virtue of powerful server program.

The user using solar power backup system needs to know the status and condition of sites installed in remote. A fault reporting and alerts log gives plenty information about the system performance. Any abnormal condition and misuse of inverter can be identified by analyzing the periodic data retrieved by this system. Also there is indeed to know the energy produced and consumed by the back-up system in usage. This all requirement is mandate the entire backup system monitoring and control. This product fulfills all monitoring requirement of solar PCUs, Solar Off-Grid and Grid-Tie Inverters.

It also provided historical records which gives performance measure of solar system You can also configure it for SMS/Email notification in case of events/alerts. This helps getting you a Real-time data pull using SMS commands. We Configures Solar PCU time and other parameters remotely.To have this facility and control All you need is a computer with updated window version.

The intended Solar System e.g. Solar Charge Controller, Solar Power Conditioning Unit (PCU), Grid-Tie Inverter etc. to be monitored are integrated with remote-gateway module to communicate to central server. Remote gateway is capable to perform variety of two-way communication. A Solar NMS is installed in strategic location can remotely monitor and control a large number of remote solar sites. An authorized user can log in to a web-portal and add their sites and keeps monitoring the solar parameters and logs as required.

User need to login with user name and password. Only after login with correct details user can access the status page and configure the data. The remote hardware is seamlessly integrated with central monitoring server and sends data with best possible way. The data is stored and analyzed by server and project the virtual view of remotely installed solar system to feel real. Based on the data analysis the NMS generates tabulated data, graphs and analytical matrix for evaluating the performance of Solar devices.

SOLAR NET MONITORING SYSTEM

LAN Based

S2E Card

Remote Monitoring

Hardware Gateway

Solar Net Monitoring System

All solar systems from the Su-Kam are compatible for remote monitoring and control functionality. All the system parameters such as PV voltage, Battery voltage, Mains charging current, Solar charging current, Output voltage, input voltage, Output Load percentage and System Operating mode are displayed in the numerical format Solar NMS can monitor and control multiple solar PCU,Solar charge controller and Solar inverter. Su-Kam has created a web-based application for real-time management of Solar Power Conditioning Units (PCUs).

Su-Kam's products, installed anywhere in the world, can now be centrally monitored and controlled by the user(s). It is the first Indian company to develop this kind of application without using the SNMP hardware. The unique and fully validated software solution allows various parameters of the systems to be checked, including load and status of each system.

It enables the Power or other relevant Deptt. of an organization to centrally monitor the status of all its Systems. Thus, an organization can conveniently monitor all its Systems installed at various locations and perform diagnosis the system on the basis of datalog and events, without visiting the installation(s) site. Think of all the unmanned locations or mission critical applications where Power Backup Systems are installed and where their assured availability is essential and mission critical. Some of the examples are ATMs, Telecom Towers, Satellite based systems, fully networked chain of Retail Stores, chain of Multiplexes, their supply chain systems, online process control equipment etc.

Data logging of System parameters can be ensured at defined time intervals say every 10 or 15 secs. This can then be plotted in graphical form for easy analysis & review of the power in terms of fluctuations, number of outages and resultant Blackouts/Brownouts etc. Additionally, we can even reassign the values of the critical decision making set points (say, Short Circuit, Overload, Battery Low, Output Voltage etc.) remotely. Such inherent flexibility lends itself for condition based operational utilization of the power backup systems thus adding considerable value and enhancing the maintainability and assured availability of systems.

This system has the feature of sending SMS & Email on the pre-designed locations in the event of any fault occurring in these equipments.

Product Features

- All-in-one communication – RS232, Ethernet, GPRS & GSM
- Remote monitoring, diagnosis and configuration of the solar power plant from anywhere in the world
- Quick detection of malfunctions and notification in case of a failure via e-mail or text message
- Data logger for all key power plant data. Flash memory for data logging
- User Friendly LED indications
- Easy remote access via the web browser

Technical Specifications

- Input Supply Voltage: 12V - 45V
- Idle Current: up to 180 mA
- On-board SIM900D GSM/GPRS quad band module wireless communication
- Broadcast messages in case of faults/alarms
- RS232, RS485, Ethernet & GSM
- Micro SD card slot for data logging
- PFCs for controlling devices
- Ports for interfacing Analog Sensors
- LED indications to show various device status
- Provision of onboard RTC
- Antenna for GSM/GPRS

Evaluate:

- Solar Power generated vs. consumed
- ROI on Solar
- System usage pattern
- Peak requirement over a specified time period

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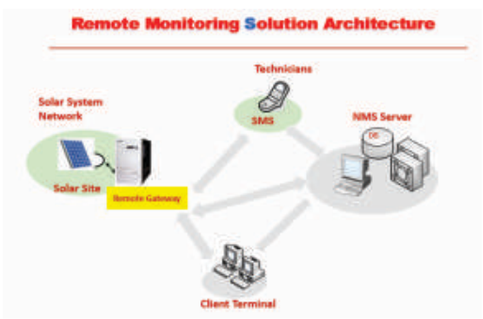
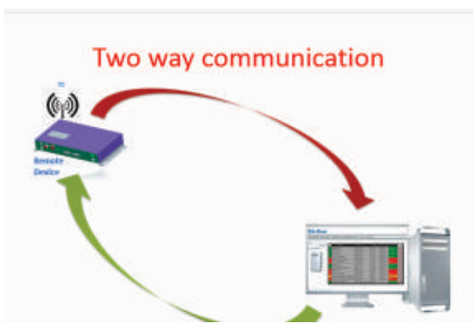
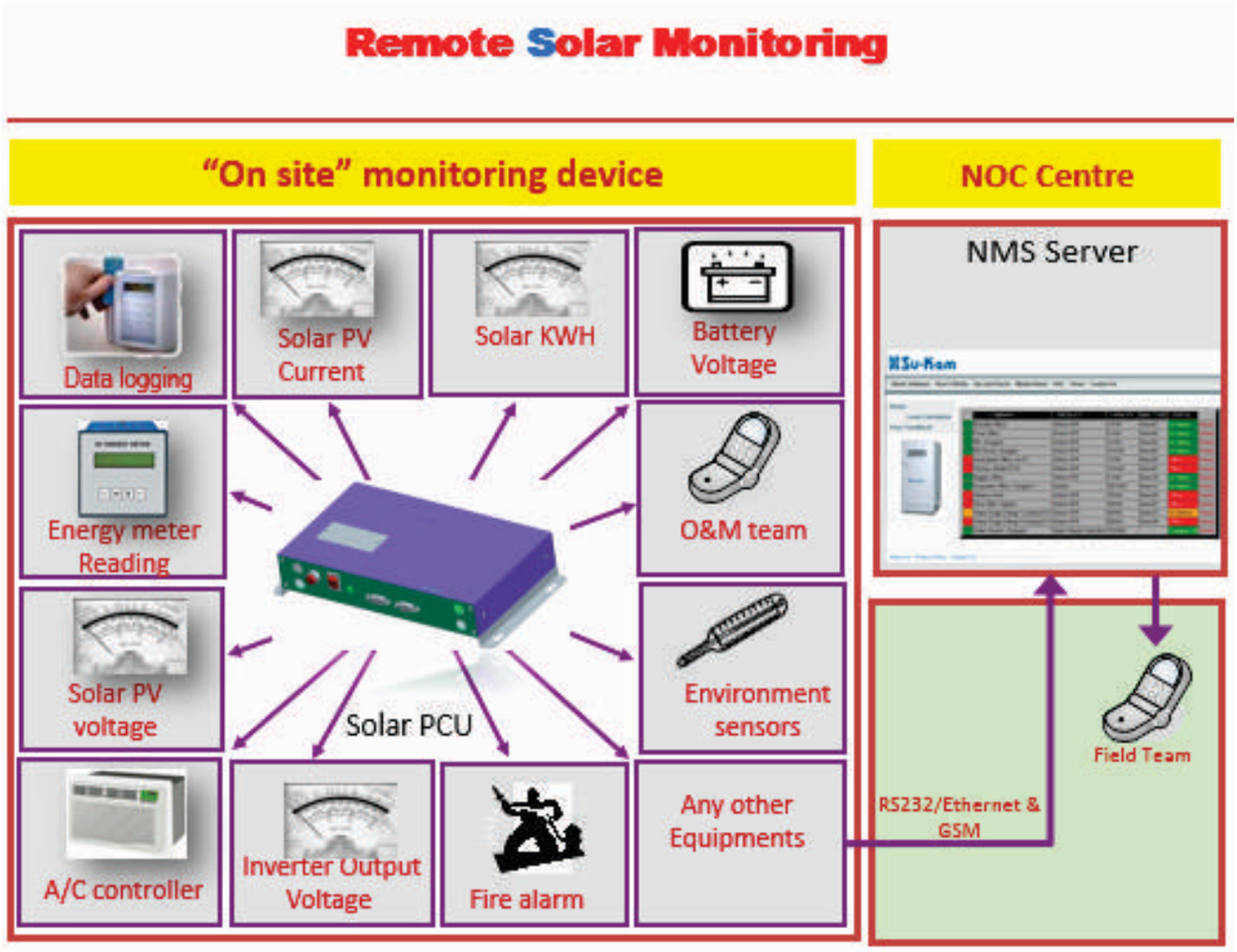
INSTALLATION DIAGRAMS





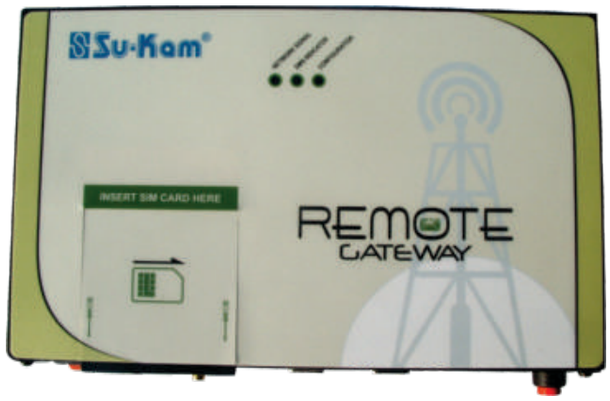


Remote Gateway

Serial Cable

Solar PCU

Solar Net Monitoring System



All solar systems from the Su-Kam stable are compatible for remote monitoring and control functionality. All the system parameters such as PV voltage, Battery voltage, Mains charging current, Solar charging current, Output voltage, input voltage, Output Load percentage and System Operating mode are displayed in the numerical format Solar NMS can monitor and control multiple solar PCU,Solar charge controller and Solar inverter. Su-Kam has created a web-based application for real-time management of Solar Power Conditioning Units (PCUs).

System monitoring, remote diagnosis, data storage and visualization: Su-Kam's NMS is the high-performance communication hub for medium to large-scale solar power plants. It continuously collects all the data from the inverters on the system side, thereby keeping you informed of the system's status at any given time.

The NMS is a multi-functional, energy efficient data logger which offers a wealth of options for displaying, archiving and processing data. In case of the event "Error", the NMS informs you immediately by e-mail or text message*. Even from remote locations where no DSL or telephone connection is available, measurement data can be transmitted via a GSM modem.

Features

- All-in-one communication – RS232, Ethernet, GPRS & GSM
- Remote monitoring, diagnosis and configuration of the solar power plant from anywhere in the world
- Quick detection of malfunctions and notification in case of a failure via e-mail or text message
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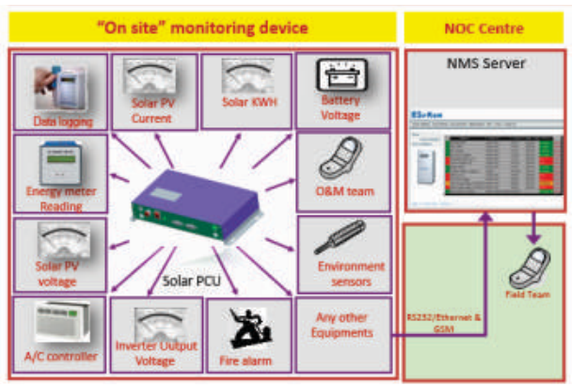
- Antenna for GSM/GPRS

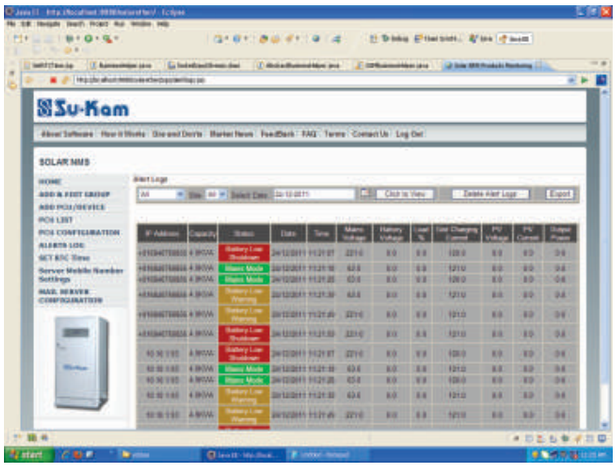
Evaluate

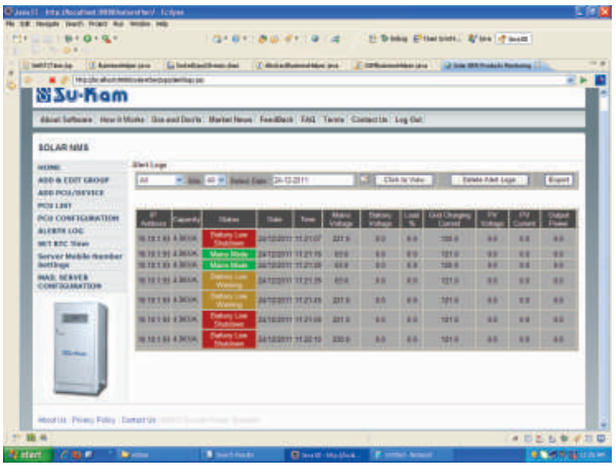
- Solar Power generated vs. consumed
- ROI on Solar
- System usage pattern
- Peak requirement over a specified time period

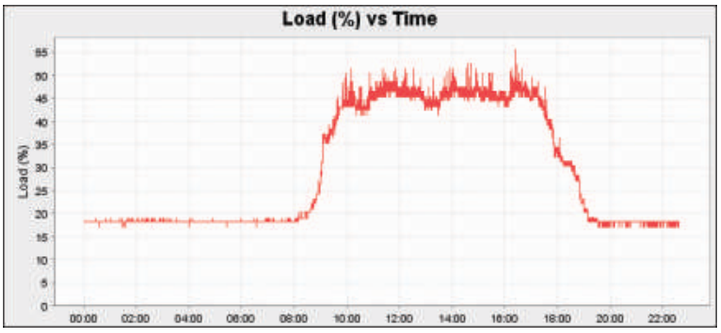
REMOTE SOLAR MONITORING



CENTRALIZED HISTORICAL RECORDS FOR EVENTS/ALARMS



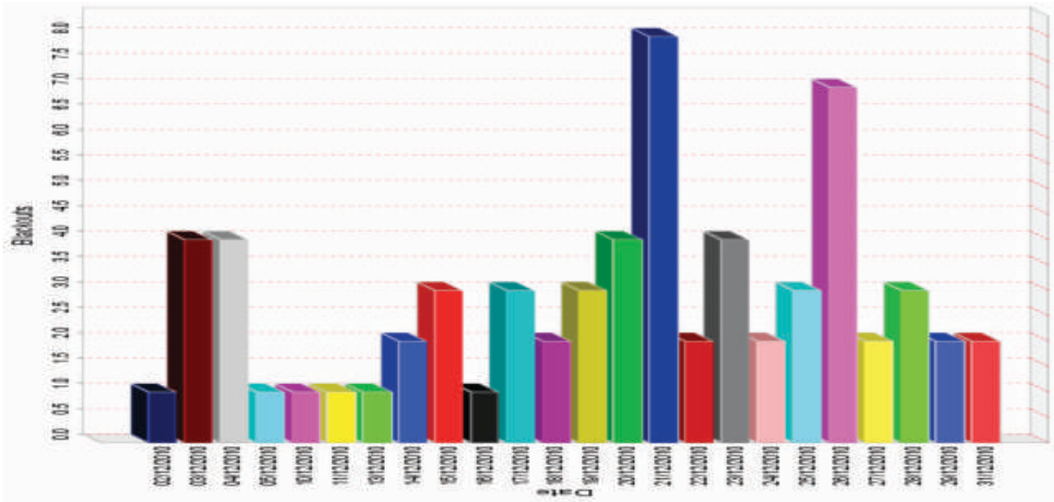




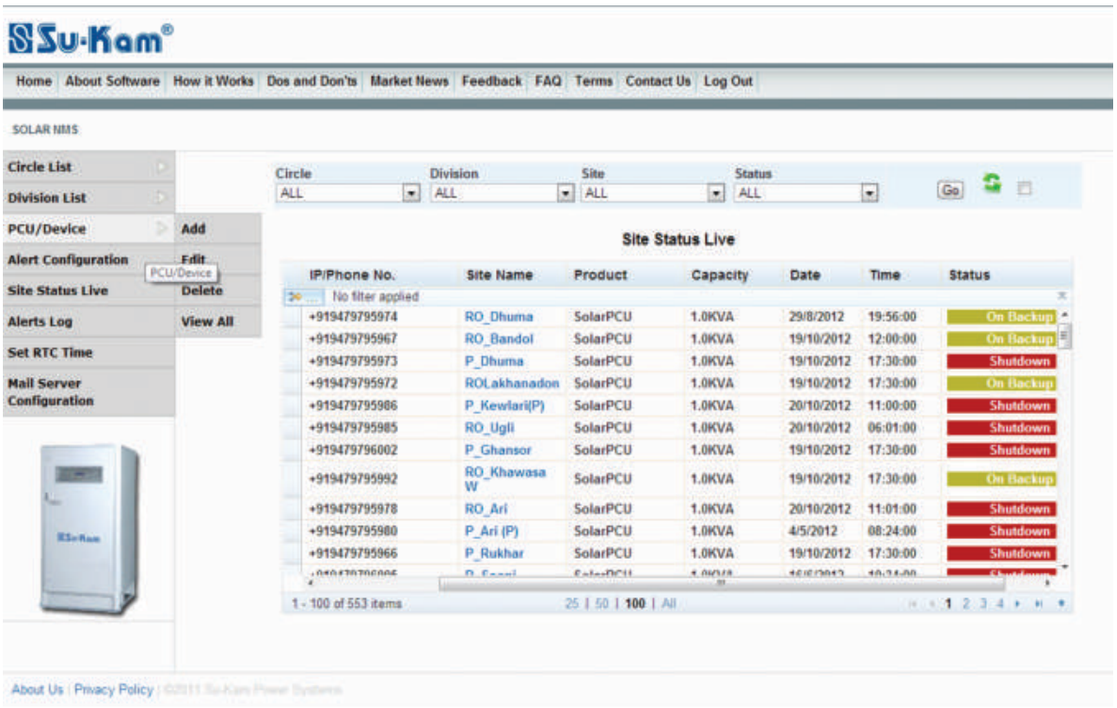
Evaluate

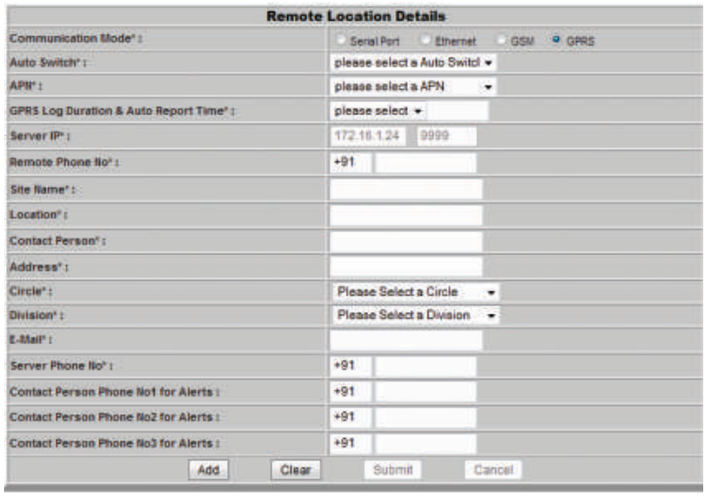
- Solar Power generated vs consumed.
- ROI on Solar
- System usage pattern.
- Peak requirement over a period.
- Mishandling of system in field.

DECEMBER 2010, BLACKOUTS (DATE VS BLACKOUTS)



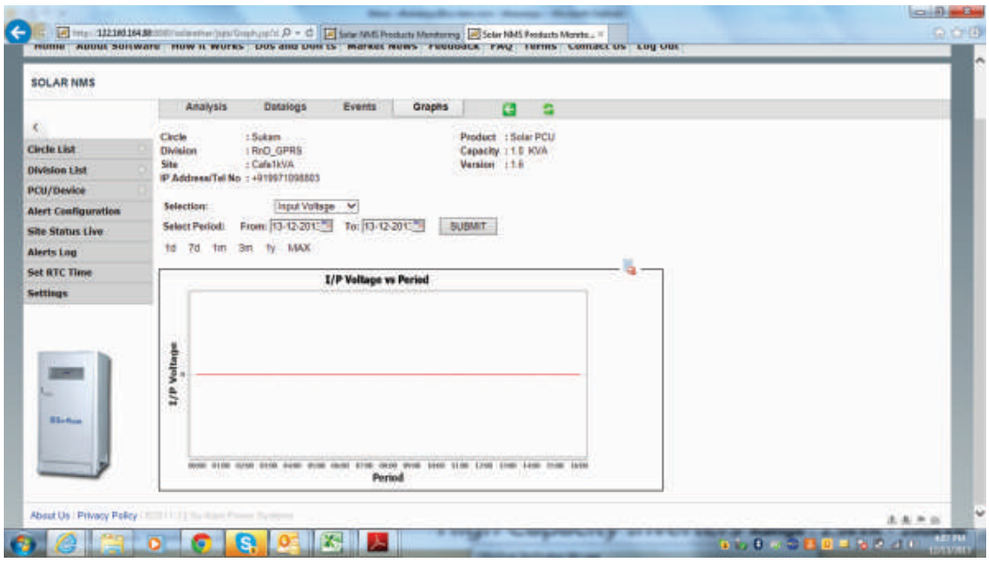
NMS LOOK AFTER MANY SITES SIMULTANEOUSLY

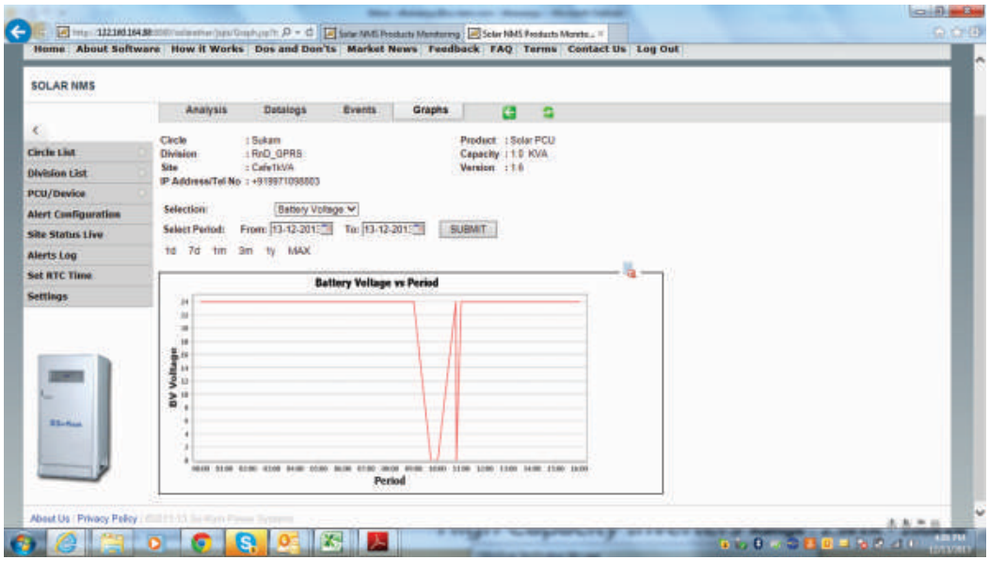


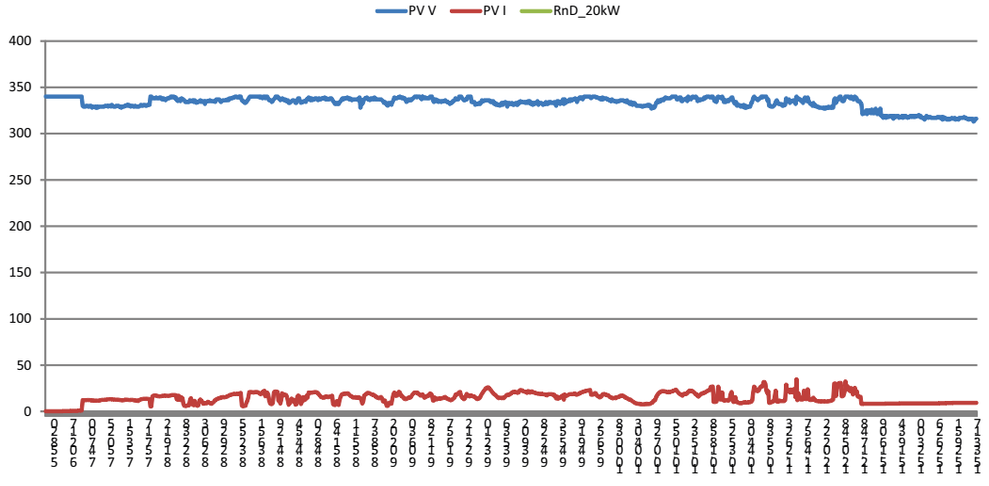


Multi communication with same application
User selectable communication configuration:-

- GSM
- GPRS
- Ethernet(LAN, VPN, Public IP)
- Serial/RS232


SOLAR NMS
Analysis
Datalogs
Events
Graphs
Circle List
Division List
PCU/Device
Alert Configuration
Site Status Live
Alerts Log
Set RTC Time
Settings
Circle : Sukam
Division : RnD_GPRS
Site : Cafe1kVA
IP Address/Tel No : +919971098803
Product : Solar PCU
Capacity : 1.0 KVA
Version : 1.6
Selection: Input Voltage
Select Period: From: 13-12-2011 To: 13-12-2011 SUBMIT
1d 7d 1m 3m 1y MAX
I/P Voltage vs Period
I/P Voltage
Period
About Us | Privacy Policy


Home
About Software
How it Works
Dos and Don'ts
Market News
Feedback
FAQ
Terms
Contact Us
Log Out
SOLAR NMS
Analysis
Datalogs
Events
Graphs
Circle List
Division List
PCU/Device
Alert Configuration
Site Status Live
Alerts Log
Set RTC Time
Settings
Circle : Sukam
Division : RnD_GPRS
Site : Cafe1kVA
IP Address/Tel No : +919971098803
Product : Solar PCU
Capacity : 1.0 KVA
Version : 1.6
Selection: Battery Voltage
Select Period: From: 13-12-2011 To: 13-12-2011 SUBMIT
1d 7d 1m 3m 1y MAX
Battery Voltage vs Period
BV Voltage
Period
About Us | Privacy Policy


PV V
PV I
RnD_20kW
400
350
300
250
200
150
100
50
0

SOLAR STREET LIGHTING SYSTEM

The solar street lights work on the principle of the photovoltaic cell or solar cell. The solar cell converts solar energy to the electrical energy which is stored in the battery. The solar lamp draws the current from this battery and it requires no other wiring.

Working of Solar Street Lights

The solar street lights use solar energy, a form of the renewable energy. These days it is common to see the solar street lamps along the sides of roads. The solar street lights comprise of the photovoltaic cells, which absorb the solar energy during daytime. The photovoltaic cells convert solar energy into electrical energy, which is stored in the battery. At the nighttime the lamp starts automatically and it consumes the electricity already stored in the battery. During the day time the battery gets recharged and the process keeps on repeating every day.

Solar LED lights

LED stands for light emitting diode. LED comprises of the chemical compound that gives of the light when direct current (DC) from the battery passes through it. Solar LEDs are available from number of companies in different sizes, shapes and styles. The life of LED is usually very high extending up to 50,000 hours. The LEDs require very little current hence the solar panels of smaller sizes are required for the solar lights with LED lamps.

Centralised solar systems

In centralised solar systems, the solar system is separated from each street light to provide power to a cluster of street lights. Although this system has problems of its own, it is considered a more viable option for converting existing street lights to solar power for the following reasons:

- The existing infrastructure such as poles and wiring does not have to be replaced to accommodate the solar system.
- The system does not have the same limitations as the stand-alone system. The result is that the solar system can be designed to be as big as required with enough batteries and panels to provide enough power to the lights.
- The solar panels can be placed away from any shade to optimise power generation.
- The batteries will be housed in an IP65, well-ventilated battery cabinet which can be insulated to provide maximum protection against heat.
- The system can easily be equipped with a monitoring device to alert authorities of any tampering or removal of equipment. This will not eliminate the threat of theft but will reduce the response time so the culprits could be caught red handed.
- The monitoring device can keep control on one or many systems. Most large inverters are equipped to facilitate monitoring software which will not only alert the relevant people of any maintenance issues, but also to send alerts if the system is over-heating or if moisture is detected in the system. This will assist the municipalities to better understand the system and to avoid major replacement of equipment.
- The maintenance will be done at one point for several lights and combined with the monitoring system; maintenance could simply be done on the system from a central computer.

The main drawback of the centralised solar system is that cables must be laid to each pole where a stand-alone system does not require cabling. It is the author's opinion that the additional cost related to stand-alone systems such as stronger poles, battery boxes, solar panels and the risk of additional maintenance will outweigh the cost of installing a centralised system.

SOLAR STREET LIGHTING SYSTEM

Centralized Street Light PCU

Range: 100VA, 500VA, 600VA, 1KVA, 2, KVA, 3KVA, 4KVA, 5KVA

Standalone (Built in Batteries) Street Light System

4Wp, 8Wp, 15Wp LED based

Standalone (External Battery) Street Light System

30Wp, 60Wp, 80Wp LED based

Solar Street Lighting System

Standalone (Built in Batteries) Street Light System- SunWay

Product Code: SLR-BL-LM-00000-00012
STL-WB-OT-00000-00008
STL-WB-OT-00000-00015

Standalone (Built in Batteries) Street Light System- SunWay

Range - 4Wp, 8Wp, 15Wp LED based

The newly designed Solar Streetlight System have the in-built lithium ion batteries. This reduces the issue of maintenance of batteries. Lithium batteries also have the capacity of fast charging as compared to normal lead acid batteries.

This stand-alone solar system consist of a pole, photovoltaic module and LED or CFL luminaires. The use of solar power coupled with energy-efficient luminaires make this double environment friendly. The configuration can be customized to the wattage and brightness required and it can be designed for dusk to dawn operations with the required number of days of autonomy.

These solar lighting systems offer an environment friendly and economical option to light up streets, boulevards, highways, yards, compounds, parks, boundary walls, car parking areas, military and civilian security installations, airports, ports or indeed, any public space.

Features

Unique Street Lighting

- High efficient solar LED street lighting (4W & 8W LED)
- Integrated battery allows simple installation
- Automatic ON/OFF with integrated sensor

High Quality and Reliability

- Super efficient LED's: more than 30,000 hrs lifetime
- Pressure die cast aluminum body for improving LEDlife
- Rechargeable
- No maintenance lithium ion batteries
- Highly efficient electronics and thermal management
- Solar Panel: minimum 10 years life
- IP65 complaint design

Application

- Street light
- Garden light
- Main gate light
- Foot path light
- Agriculture uses (Farm houses)
- Parking light
- Shopping centers
- Commercial sector

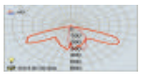
SELECTION MATRIX

Model	Lumens	Height (m)	Lux	Distance between lights (meters)	Charge controller	Battery	Battery Type	Autonomy	Solar Panel
4W	400	3	21	5m-7m	Internal	3.7V, 10.2Ah	Li Integrated	No	14W
8W	700	4	21	6m-8m	Internal	14.8V, 5.2Ah	Li Integrated	No	26W
15W	1100	4	28	8m-10m	Internal	14.8V, 5.2Ah	Li Integrated	Yes, dimmer	35W

TECHNICAL SPECIFICATIONS

Parameter	Units	4W	8W	15W
Solar Charging – full sunlight	hrs	8	8	8
Run time (min.)	hrs	10	10	12
Battery Capacity	mAh	10400	5200	5200
Battery nominal voltage	V	3.7	14.8	14.8
Battery upper cutoff voltage (after stabilization)	V	4.25	16.8	16.8
Battery lower cutoff voltage (after stabilization)	V	3	12	12
Solar Panel Pm / Vm / Im	Wp / V / I	14 / 5.88 / 2.4	26 / 17.4 / 1.5	35 / 17.4 / 2
Light output (Avg)	Lux	12 (at 4m height	23 (at 4m height	33
		& 4m dia)	& 4m dia)	
LED Forward Voltage / Current	V / mA	3 / 350	3 / 350	3 / 350
LED Luminous Intensity	Lumen	140	140	
LED Directivity	degree (2 /2)	120	120	
Lens FWHM angle	degree	108 X 48	108 X 48	108 X 48
Power Consumption	W	4	7	12
Idle current	μA	10	10	<10
Battery lifetime	Yrs	Min 1 yr	Min 1 yr	
IP		65	65	65
Dimension (l×w×h)	mm	380 X 135 X 60	450 X 200 X 120	450 X 200 X 120
Weight (light only)	gms	1780	3600	3600

TECHNICAL SPECIFICATIONS

Parameter	Units	30W	60W	80W
Solar Charging full sunlight	hrs	8	8	8
Run time	hrs	12	12	12
Battery Capacity	Ah	50	100	150
Solar Panel Pm	Wp	75	120	200
Solar Panel Vm	V	16.92	16.4	16.4
Solar Panel Im	A	4.43	7.3	12
Solar Charge controller		12V/10A	12V/10A	12V/20A
Light output (Avg)	Lumen	2800	5300	7350
LED Vf	V	3.4	3.4	3.4
LED If	A	1.1	1.1	1.1
Lens directivity	Beam pattern			
Power Consumption	W	30	58	80
Idle current	mA	<10	<10	<10
IP		65	65	65
Luminaire pipe dia	mm	40	65	50
Luminaire Weight	Kg	3	3.5	6

Solar Street Lighting System

Standalone (Built in Batteries) Street Light System- SunWay

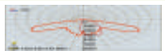
Product Code: STL-WB-OT-00000-00030
STL-WB-OT-00000-00060
STL-WB-OT-00000-00080

Range - 30Wp, 60Wp, 80Wp LED based

These are lense backed LED based solar powered street lighting system. It has the advantage of configuring as per the back-up & individual requirement of the customer. The high efficiency LED based street lighting system has more LUX and at the same time reduces the size of panels.

Features

- High efficient solar LED street lighting
- Automatic ON/OFF with integrated sensor
- Solar panel: minimum 5 years life
- Super-efficient LM80 certified LED: 5 to 10 years life
- Rechargeable, NO maintenance Lead Acid Battery Tubular battery
- Pressure Die Cast Aluminum body for improving led life.
- IP65 compliant design
- High efficiency electronics and thermal management
- 1 year warranty

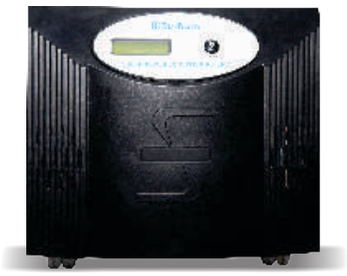
Parameter	Units	60W, Typical
Solar Charging – full sunlight	hrs	8
Run time	hrs	12
Battery Capacity	Ah	100
Solar Panel Pm	Wp	120
Solar Panel Vm	V	16.4
Solar Panel Im	A	7.3
Solar Charge controller		12V/10A
Light output (Avg)	Lumen	5300
LED Vf	V	3.4
LED If	A	1.1
Lens directivity	Beam pattern	
Power Consumption	W	58
Idle current	mA	<10
IP		65
Lumin aire pipe dia	mm	65
Luminaire Weight	Kg	3.5

SELECTION MATRIX

Item	Model	Lumens (m)	height	Lux lights (meters)	Distance between	Charge controller	Battery	Battery Type
1	30W	2900	5	34	18m-20m	External,12V,10A	12V, 130Ah	LA
2	60W	5800	7	34	20m-25m	External,12V,20A	12V, 100Ah	LA
3	60W	5800	7	34	20m-25m	External,12V,20A	12V, 160Ah	LA
4	60W	5800	7	34	20m-25m	External,12V,20A	12V, 240Ah	LA
5	80W	7700	8	35	25m-30m	External,12V,20A	12V, 120Ah	LA
6	80W	7700	8	35	25m-30m	External,12V,20A	12V, 240Ah	LA
7	80W	7700	8	35	25m-30m	External,12V,20A	12V, 320Ah	LA

Solar Street Lighting System

Centralized Street Light PCU



Centralized Street Light PCU

Range - 500VA, 1KVA, 2, KVA, 3KVA, 4KVA, 5KVA, 6KVA

Concept of Centralized Street Light PCU

The existing street lights which were powered from grid supply are now powered from centralized solar power plant in clusters of 10 with provision for grid backup.

The existing street lights with 40W tube lights or equivalent & filament lamps are replaced with 20W LED Lights.

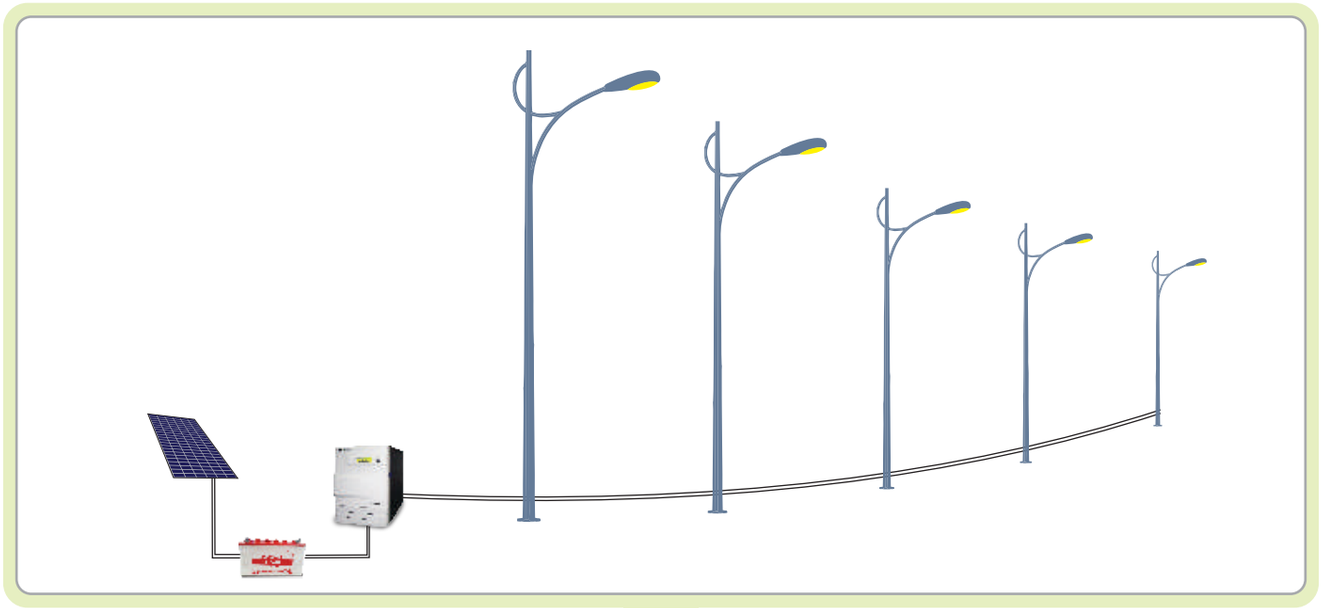
The Smart Power Conditioning Unit in the system allows charging of battery from grid, only in rainy or cloudy days, when solar power is not sufficient to charge the battery in full during 10am-6pm only.

Features

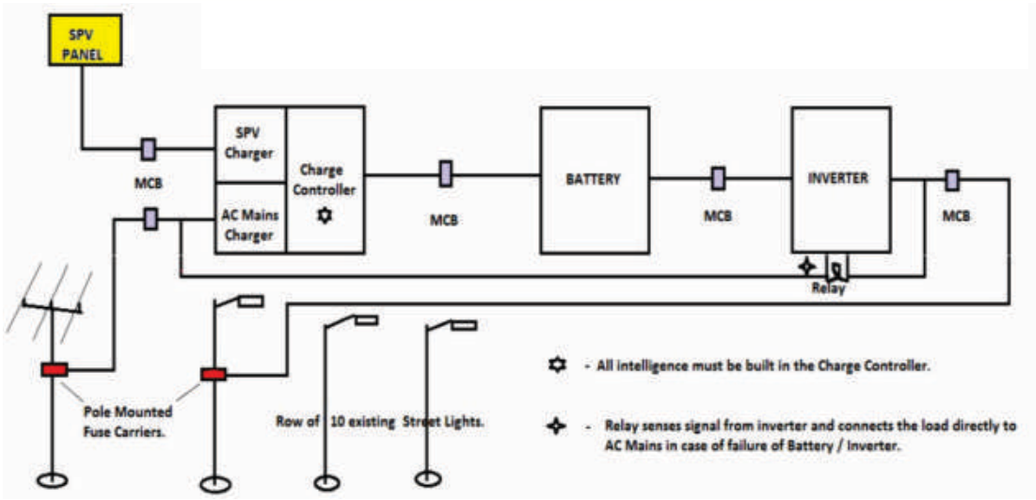
- True Energy meter for output parameters : inverter output ac V, I, VA & kWh
- Solar PV array's generation kWh, V and I
- Battery Voltage, charging & discharging current along with graphical indication of battery status
- Input power factor of grid battery charger 0.85 with >85% efficiency @ nominal ac input V
- RTC Based system operation for street light
- RTC for date and time display
- IEC Test reports as per MNRE guideline

Centralized street light Advantage over Standalone

- Centralized street light are easy to maintain(Battery top up and Module cleaning)
- Integration of AC(PCU) is possible in centralized street light(battery can also charge with grid supply during non-availability of solar)
- Prevention of theft
- Low Maintenance cost



Block Diagram of Centralized PV Plant Energising Cluster of Street Light. Category - 1



SELECTION MATRIX

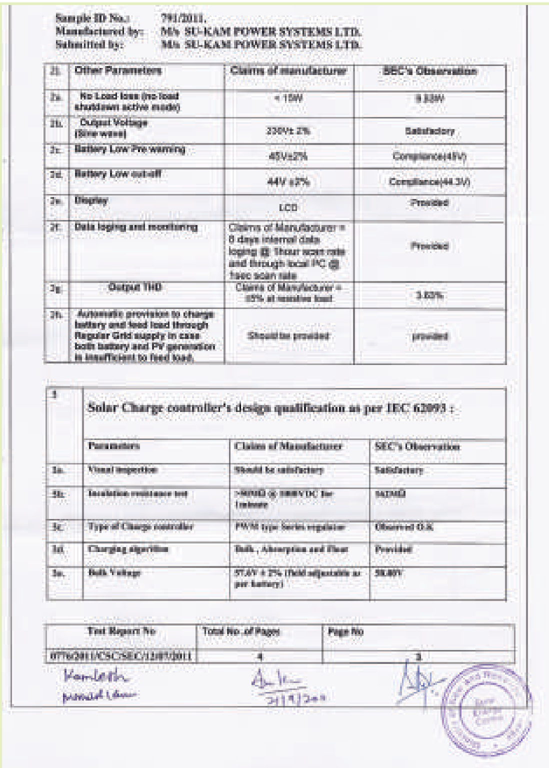
PCU for Centralized Street Light System

Street lights are LED type with dimming feature from 11pm to 5am

PCU	PV array	Battery		No. of Lights	Power of each light
kW	kWp	Voltage	Ah	nos	W
0.5	0.6	24	200	10	20
1	1	24	300	17	20
2	2	48	300	27	25
3	3	48	450	40	25
4	4	96	300	34	40
5	5	96	400	42	40
6	6	96	450	50	40

Street lights are LED type without dimming feature

PCU	PV array	Battery		No. of Lights	Power of each light
kW	kWp	Voltage	Ah	nos	W
0.5	0.6	24	200	6	20
1	1	24	300	10	20
2	2	48	300	16	25
3	3	48	450	24	25
4	4	96	300	20	40
5	5	96	400	25	40
6	6	96	450	30	40



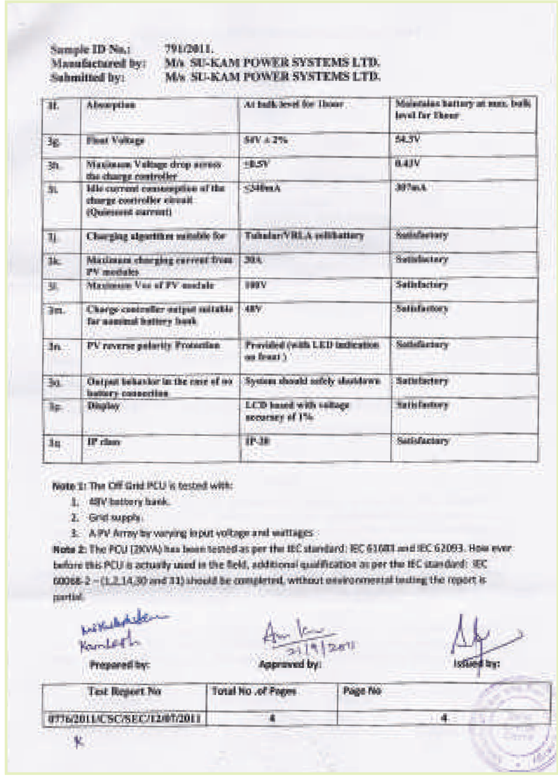
Sample ID No.: 791/2011.
Manufactured by: M/s SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s SU-KAM POWER SYSTEMS LTD.

2.	Other Parameters	Claims of manufacturer	SEC's Observation
2a.	No Load loss (no load shutdown active mode)	< 15W	9.83W
2b.	Output Voltage (Sine wave)	230V± 2%	Satisfactory
2c.	Battery Low Pre warning	45V±2%	Compliance(45V)
2d.	Battery Low cut-off	44V ±2%	Compliance(44.3V)
2e.	Display	LCD	Provided
2f.	Data loging and monitoring	Claims of Manufacturer = 8 days internal data loging @ 1hour scan rate and through local PC @ 1sec scan rate	Provided
2g.	Output THD	Claims of Manufacturer = ≤5% at resistive load	3.83%
2h.	Automatic provision to charge battery and feed load through Regular Grid supply in case both battery and PV generation is insufficient to feed load.	Should be provided	provided

3	Solar Charge controller's design qualification as per IEC 62093 :		
	Parameters	Claims of Manufacturer	SEC's Observation
3a.	Visual inspection	Should be satisfactory	Satisfactory
3b.	Insulation resistance test	>50MΩ @ 500VDC for 1minute	50MΩ
3c.	Type of Charge controller	PWM type Series regulator	Observed O.K
3d.	Charging algorithm	Bulk, Absorption and Float	Provided
3e.	Bulk Voltage	57.6V ± 2% (field adjustable as per battery)	58.80V

Test Report No	Total No .of Pages	Page No
0776/2011/CSC/SEC/12/07/2011	4	3

TUV: PCU 600VA - page 1



Sample ID No.: 791/2011.
Manufactured by: M/s SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s SU-KAM POWER SYSTEMS LTD.

3f.	Absorption	At bulk level for 1hour	Maintains battery at max. bulk level for 1hour
3g.	Float Voltage	54V ± 2%	54.3V
3h.	Maximum Voltage drop across the charge controller	≤0.5V	0.43V
3i.	Idle current consumption of the charge controller circuit (Quiescent current)	≤340mA	307mA
3j.	Charging algorithm suitable for	Tubular/VRLA cell/battery	Satisfactory
3k.	Maximum charging current from PV modules	20A	Satisfactory
3l.	Maximum Voc of PV module	100V	Satisfactory
3m.	Charge controller output suitable for nominal battery bank	48V	Satisfactory
3n.	PV reverse polarity Protection	Provided (with LED indication on front)	Satisfactory
3o.	Output behavior in the case of no battery connection	System should safely shutdown	Satisfactory
3p.	Display	LCD based with voltage accuracy of 1%	Satisfactory
3q.	IP class	IP-30	Satisfactory

Note 1: The Off Grid PCU is tested with:

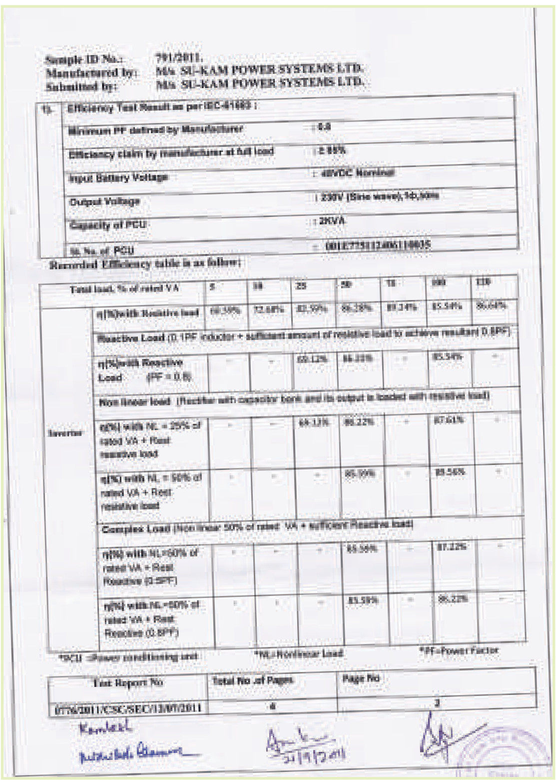
1. 48V battery bank.
2. Grid supply.
3. A PV Array by varying input voltage and wattages.

Note 2: The PCU (2KVA) has been tested as per the IEC standard: IEC 61683 and IEC 62093. How ever before this PCU is actually used in the field, additional qualification as per the IEC standard: IEC 60068-2 – (1,2,14,30 and 33) should be completed, without environmental testing the report is partial.

Prepared by: Approved by: Issued by:

Test Report No	Total No .of Pages	Page No
0776/2011/CSC/SEC/12/07/2011	4	4

TUV: PCU 600VA - page 2



Sample ID No.: 791/2011.
Manufactured by: M/s SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s SU-KAM POWER SYSTEMS LTD.

1.	Efficiency Test Result as per IEC-61683 :	
	Minimum PF defined by Manufacturer	: 0.8
	Efficiency claim by manufacturer at full load	: ≥ 85%
	Input Battery Voltage	: 48VDC Nominal
	Output Voltage	: 230V (Sine wave),1Φ,50Hz
	Capacity of PCU	: 2KVA
	Sl. No. of PCU	: 001E775112406110035

Recorded Efficiency table is as follow:

	Total load, % of rated VA	5	10	25	50	75	100	110
Inverter	η(%)with Resistive load	60.59%	72.68%	82.59%	86.28%	89.24%	85.54%	86.64%
	Reactive Load (0.1PF inductor + sufficient amount of resistive load to achieve resultant 0.8PF)							
	η(%)with Reactive Load (PF = 0.8)	-	-	69.12%	86.23%	-	85.54%	-
	Non linear load (Rectifier with capacitor bank and its output is loaded with resistive load)							
	η(%) with NL = 25% of rated VA + Rest resistive load	-	-	69.13%	86.22%	-	87.61%	-
	η(%) with NL = 50% of rated VA + Rest resistive load	-	-	-	85.59%	-	89.56%	-
	Complex Load (Non linear 50% of rated VA + sufficient Reactive load)							
	η(%) with NL=50% of rated VA + Rest Reactive (0.8PF)	-	-	-	85.56%	-	87.22%	-
	η(%) with NL=50% of rated VA + Rest Reactive (0.8PF)	-	-	-	85.59%	-	86.22%	-

*PCU =Power conditioning unit *NL=Nonlinear Load *PF=Power Factor

Test Report No	Total No .of Pages	Page No
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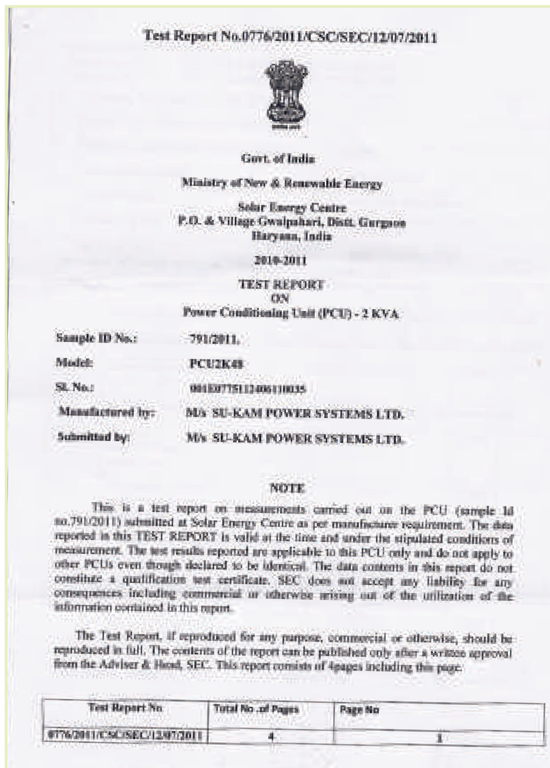
TUV: Solar PCU with MPPT



Test Report No.0776/2011/CSC/SEC/12/07/2011

Govt. of India
Ministry of New & Renewable Energy
Solar Energy Centre
P.O. & Village Gwalpahari, Distt. Gurgaon
Haryana, India
2010-2011

TEST REPORT
ON
Power Conditioning Unit (PCU) - 2 KVA

Sample ID No.: 791/2011.
Model: PCU2K48
Sl. No.: 001E0775112406110035
Manufactured by: M/s SU-KAM POWER SYSTEMS LTD.
Submitted by: M/s SU-KAM POWER SYSTEMS LTD.

NOTE

This is a test report on measurements carried out on the PCU (sample Id no.791/2011) submitted at Solar Energy Centre as per manufacturer requirement. The data reported in this TEST REPORT is valid at the time and under the stipulated conditions of measurement. The test results reported are applicable to this PCU only and do not apply to other PCUs even though declared to be identical. The data contents in this report do not constitute a qualification test certificate. SEC does not accept any liability for any consequences including commercial or otherwise arising out of the utilization of the information contained in this report.

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Test Report No	Total No .of Pages	Page No
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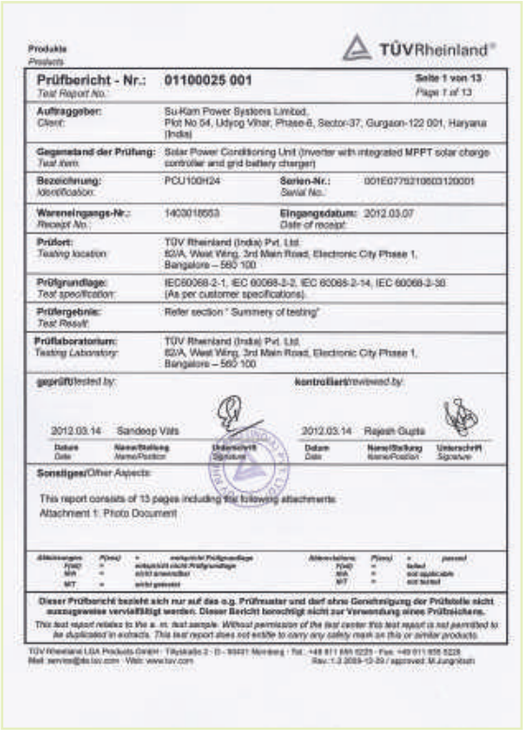
TUV: PCU 100 VA



Produkte
Products

TÜVRheinland®

Prüfbericht - Nr.: 01100025 001 — Seite 1 von 13 / Page 1 of 13

Auftraggeber: Client:	Su-Kam Power Systems Limited, Plot No 54, Udyog Vihar, Phase-6, Sector-37, Gurgaon-122 001, Haryana (India)
Gegenstand der Prüfung: Test item:	Solar Power Conditioning Unit (Inverter with integrated MPPT solar charge controller and grid battery charger)
Bezeichnung: Identification:	PCU100H24 — **Serien-Nr.:** Serial No.: 001E07752106031200001
Wareneingangs-Nr.: Receipt No.:	1403018653 — **Eingangsdatum:** Date of receipt: 2012.03.07
Prüfort: Testing location:	TÜV Rheinland (India) Pvt. Ltd. 82/A, West Wing, 3rd Main Road, Electronic City Phase 1, Bangalore – 560 100
Prüfgrundlage: Test specification:	IEC60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30 (As per customer specifications).
Prüfergebnis: Test Result:	Refer section " Summery of testing"
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland (India) Pvt. Ltd. 82/A, West Wing, 3rd Main Road, Electronic City Phase 1, Bangalore – 560 100

geprüft/tested by: 2012.03.14 Sandeep Vats — **kontrolliert/**reviewed by: 2012.03.14 Rajesh Gupta

Sonstiges/Other Aspects:

This report consists of 13 pages including the following attachments:
Attachment 1: Photo Document

Abkürzungen: P(ass) = entspricht Prüfgrundlage; F(ail) = entspricht nicht Prüfgrundlage; N/A = nicht anwendbar; N/T = nicht getestet
Abbreviations: P(ass) = passed; F(ail) = failed; N/A = not applicable; N/T = not tested

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
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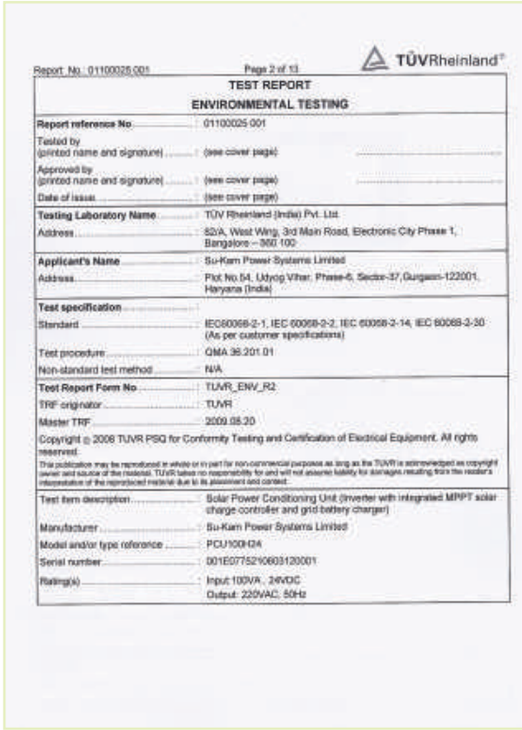
Mail: service@de.tuv.com · Web: www.tuv.com — Rev. 1.2 2009-12-30 / approved: M.Jungbluth

Test report: PCU (2KVA) - page 1



Report No. 01100025 001 — Page 2 of 13 — TÜVRheinland®

TEST REPORT
ENVIRONMENTAL TESTING

Report reference No.	01100025 001
Tested by (printed name and signature)	(see cover page)
Approved by (printed name and signature)	(see cover page)
Date of issue	(see cover page)
Testing Laboratory Name	TÜV Rheinland (India) Pvt. Ltd.
Address	82/A, West Wing, 3rd Main Road, Electronic City Phase 1, Bangalore – 560 100
Applicant's Name	Su-Kam Power Systems Limited
Address	Plot No.54, Udyog Vihar, Phase-6, Sector-37,Gurgaon-122001, Haryana (India)
Test specification	
Standard	IEC60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30 (As per customer specifications)
Test procedure	QMA 36.201.01
Non-standard test method	N/A
Test Report Form No	TUVR_ENV_R2
TRF originator	TUVR
Master TRF	2009.08.20

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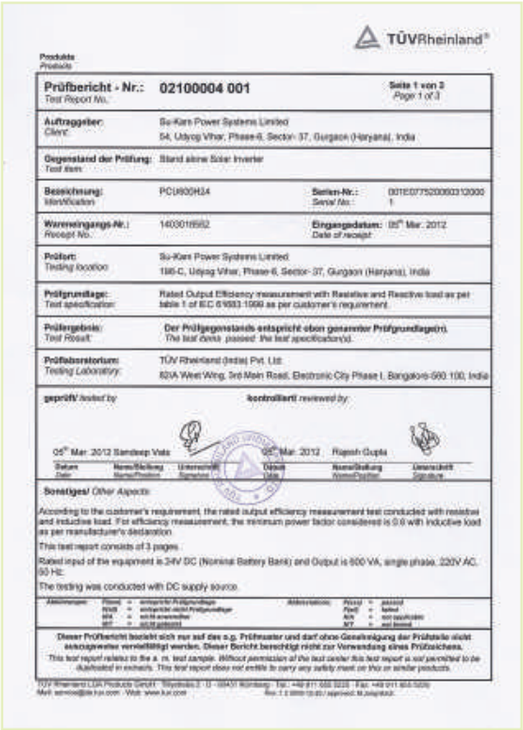
Test item description	Solar Power Conditioning Unit (Inverter with integrated MPPT solar charge controller and grid battery charger)
Manufacturer	Su-Kam Power Systems Limited
Model and/or type reference	PCU100H24
Serial number	001E07752106031200001
Rating(s)	Input:100VA , 24VDC Output: 220VAC, 50Hz

Test report: PCU (2KVA) - page 2



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Prüfbericht - Nr.: 02100004 001 — Seite 1 von 3 / Page 1 of 3

Auftraggeber: Client:	Su-Kam Power Systems Limited 54, Udyog Vihar, Phase-6, Sector- 37, Gurgaon (Haryana), India
Gegenstand der Prüfung: Test item:	Stand alone Solar Inverter
Bezeichnung: Identification:	PCU600H24 — **Serien-Nr.:** Serial No.: 001E07752006031200001
Wareneingangs-Nr.: Receipt No.:	1403018662 — **Eingangsdatum:** Date of receipt: 05th Mar. 2012
Prüfort: Testing location:	Su-Kam Power Systems Limited 198-C, Udyog Vihar, Phase-6, Sector- 37, Gurgaon (Haryana), India
Prüfgrundlage: Test specification:	Rated Output Efficiency measurement with Resistive and Reactive load as per table 1 of IEC 61683:1999 as per customer's requirement.
Prüfergebnis: Test Result:	**Der Prüfgegenstands entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland (India) Pvt. Ltd. 82/A West Wing, 3rd Main Road, Electronic City Phase I, Bangalore-560 100, India

geprüft/ tested by: 05th Mar. 2012 Sandeep Vats — **kontrolliert/** reviewed by: 05th Mar. 2012 Rajesh Gupta

Sonstiges/ Other Aspects:

According to the customer's requirement, the rated output efficiency measurement test conducted with resistive and inductive load. For efficiency measurement, the minimum power factor considered is 0.8 with inductive load as per manufacturer's declaration.

This test report consists of 3 pages.

Rated input of the equipment is 24V DC (Nominal Battery Bank) and Output is 600 VA, single phase, 220V AC, 50 Hz.

The testing was conducted with DC supply source.

Abkürzungen: P(ass) = entspricht Prüfgrundlage; F(ail) = entspricht nicht Prüfgrundlage; N/A = nicht anwendbar; N/T = nicht getestet
Abbreviations: P(ass) = passed; F(ail) = failed; N/A = not applicable; N/T = not tested

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Mail: service@de.tuv.com · Web: www.tuv.com — Rev. 1.2 2009-12-30 / approved: M.Jungbluth

Test report: PCU (2KVA) - page 3

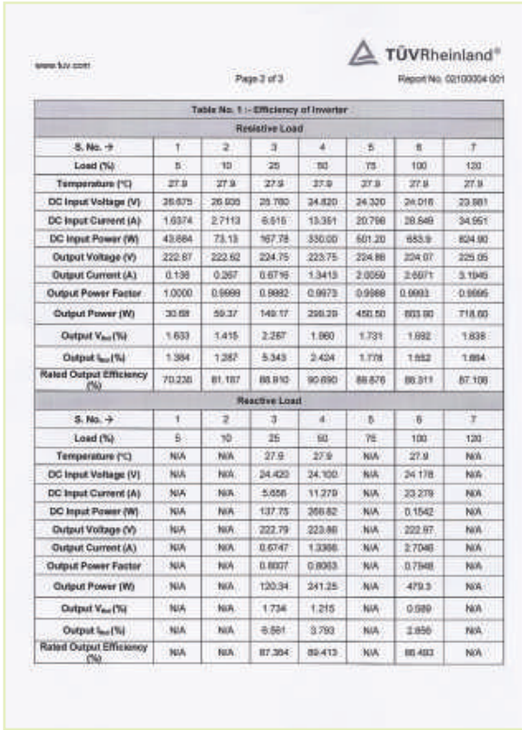

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Table No. 1 :- Efficiency of Inverter

Resistive Load

S. No. →	1	2	3	4	5	6	7
Load (%)	5	10	25	50	75	100	120
Temperature (°C)	27.9	27.9	27.9	27.9	27.9	27.9	27.9
DC Input Voltage (V)	26.675	26.635	25.760	24.820	24.320	24.016	23.881
DC Input Current (A)	1.6374	2.7113	6.515	13.351	20.796	28.649	34.951
DC Input Power (W)	43.684	73.13	167.78	330.00	501.20	653.9	824.90
Output Voltage (V)	222.87	222.62	224.75	223.75	224.86	224.07	225.05
Output Current (A)	0.138	0.267	0.6716	1.3413	2.0059	2.6071	3.1046
Output Power Factor	1.0000	0.9999	0.9992	0.9973	0.9998	0.9993	0.9999
Output Power (W)	30.68	59.37	149.17	298.29	450.50	583.90	718.00
Output V_{thd} (%)	1.633	1.415	2.257	1.860	1.731	1.692	1.838
Output I_{thd} (%)	1.384	1.282	5.343	2.424	1.778	1.652	1.884
Rated Output Efficiency (%)	70.236	81.187	88.910	90.890	89.876	89.311	87.106

Reactive Load

S. No. →	1	2	3	4	5	6	7
Load (%)	5	10	25	50	75	100	120
Temperature (°C)	N/A	N/A	27.9	27.9	N/A	27.9	N/A
DC Input Voltage (V)	N/A	N/A	24.420	24.100	N/A	24.178	N/A
DC Input Current (A)	N/A	N/A	5.656	11.279	N/A	23.279	N/A
DC Input Power (W)	N/A	N/A	137.75	268.82	N/A	0.1542	N/A
Output Voltage (V)	N/A	N/A	222.79	223.86	N/A	222.97	N/A
Output Current (A)	N/A	N/A	0.6747	1.3366	N/A	2.7048	N/A
Output Power Factor	N/A	N/A	0.8007	0.8063	N/A	0.7948	N/A
Output Power (W)	N/A	N/A	120.34	241.25	N/A	479.3	N/A
Output V_{thd} (%)	N/A	N/A	1.734	1.215	N/A	0.989	N/A
Output I_{thd} (%)	N/A	N/A	6.561	3.793	N/A	2.856	N/A
Rated Output Efficiency (%)	N/A	N/A	87.364	89.413	N/A	88.493	N/A

Test report: PCU (2KVA) - page 4

SOLAR HOME LIGHTING SYSTEM

Su-Kam has introduced a wide range of portable and highly compact solar lighting systems. These include Su-Kam's Solar Home Lighting System (SHLS), Sparkle, Sunglow and Sunbeam. All the aforementioned lighting systems are compact, portable and easily mountable. Equipped with the latest solar technologies, they serve as an economical solution to all power problems. They harness the sun's energy to light up homes and power small appliances. Su-Kam's SHLS, Sunglow and Sparkle were launched in 2013. The range's new addition sunbeam was recently launched in 2014.

I. Sunbeam & Sunbeam - M

Sunbeam is a DC solar lighting system that can charge the battery from solar panel with the help of inbuilt SCC. It is a standalone system in which the connected battery gets charged from solar power in the day time and the battery backup is used in the night to light up led lamps. Sunbeam gives the flexibility to the user to use the system according to his requirement. It can be installed with an input panel of up to 80Wp, battery capacity of 100 Ah and can light up to 50 W of DC load. It also provides protection from short circuit. It can offer power supply upto 24 hours depending upon the battery used for charging etc.

II. Sparkle

Sparkle Solar Home Lighting System is a cost effective lighting system based on hybrid technology which offers both low light and bright light depending upon the requirement of the user. It provides a backup of 5 hours. Sparkle is quite portable and lightweight and also includes a solar panel. It can charge with both solar and main power and provides emergency backup via its built in

Lithium Ion Battery to meet power needs. It can charge in just two hours when the sun is at its peak. It can also be used as a mobile torch. It can automatically convert to backup mode on power outage when light is on. Low idle current (10μA) allows light to be kept in unused state for weeks without going into deep discharge. It has ABS plastic body that makes it shock and vibration proof. Su-Kam's Sparkle is the brightest & safest solution for guardrooms, remote area resorts and also various home applications like garden lighting or lighting rooms.

III. Sunglow

Sunglow is the world's lightest, multi-functional, plug and play room light that can be used for homes or any commercial applications. It provides a backup of 15 hours. It is one of the most innovative, energy efficient, and cost effective lighting solutions. It has options for both solar and grid charging and hence one can charge mobile and run radio uninterrupted. This next generation lighting provides 20-40% lower cost of ownership compared to emergency tube lights.

Based on hybrid technology, Sunglow is light weight, easy to install and can be used as a table lamp or can be wall mounted. It can be used in study, shops etc. The palm size solar panel and light mounting clips allow portability. It has Super-efficient LED's with more than 30000 hrs lifespan. It also has a built in rechargeable lithium ion battery and ABS plastic body that makes it rugged and hard to break.

IV. Solar Home Lighting System

The Su-Kam Solar Home Lighting System can be used at many different locations – parking, security, guard rooms, homes, walkways, verandahs, and balcony or in any non-electrified area. It is compact, portable and easily mountable and comes in an easy-to-install kit. It provides a backup of 32 hours.

SOLAR HOME LIGHTING SYSTEM

Solar PV Lighting System

10Wp

Sparkle

2 LED Bulbs

SunGlow

Single LED Tubelight

Sunbeam-DC System

5W to 120W

Product Code: SLR-SC-VH-01200-00010

SOLARPV - Solar Home Lighting System

Su-Kam's Solar Home Lighting System (SHLS) harnesses the sun's energy to light up your home and power your small appliances. With benefits that extend both to your wallet and to the environment, Su-Kam's Solar Home Lighting System is not just a 'brilliant' idea; it is a 'responsible' one.

Providing illumination powered from the sun's renewable energy, the solar cells in the system convert the sun's energy directly to electricity. This electricity is stored in the battery and used for lighting whenever required.

Su-Kam's Solar Home Lighting System, compact, portable and easily mountable, is an economical solution to all your power problems and comes in an easy-to-install kit.

Features
- Automatic Mode
- The system will sense sunlight on the panel and accordingly switch ON/OFF. Your bulb in-house. i.e., if it receives sunlight, bulb will switch ON & if doesn't bulb will switch OFF.

Power Saver
- Saves 30% of your electricity bill if used on a day-to day basis.

Long back-up lighting system
- Provides long back-up Lighting System at zero running cost
  - 32 hrs (with single lamp)*
  - 15 hrs (with double lamp)
  - 8 hrs (with double lamp + radio)

So Easy to Use – Even Kids Can Install This!

The System has easy assembly and no confusing wires. Setting up your lights can be as simple as hanging them on a tree or staking them into the ground!

Safe for Kids

The System has no risk of electrocution and the lights are cool to the touch, making them safe for children and pets.

Non-Polluting

Powered by the sun's renewable energy, the system is energy neutral and an absolutely clean source of illumination. 1kWp solar installation can reduce ½ ton Co2 per annum.

No Maintenance

The System has few moveable parts - reducing the risk of breakage. Once installed, it lasts for long time and requires little attention.

Versatile

The Solar Home Lighting System can be used in many different locations - walkways, verandahs, balcony or in any non-electrified area. Compact, portable and easily mountable.

Applications
- Guard Room
- Small House/Rural Area
- Park & Gardens
- Parking Lot
- Mobile Charging

Electrical	
Battery Voltage Rating	12 Volt Battery (12V/7.2AH x 1 no)
Solar PV Panel Recommended	10W (5Wmin - 20Wmax)
Maximum Battery Charging Current Limit	1.5 ± 0.2 A
Bulk Charging voltage	14.2 V ±0.2V
Float Charging voltage	13.7 V ±0.2V
Battery Low Cut	11.0V ± 0.2V (Load dependent)
Battery Low Reconnect	11.6V ± 0.2V (Load dependent)
High Battery Cut	15.5 ± 0.2 V
Idle current (Nominal)	0 A
Radio supply/Mobile charger V	5.8V ± 02 V (NLV).
Radio supply/Mobile charger I limit	300 mA
Over load Current (150%)	1.5 ± 0.2 A
In Auto Mode, Lights are ON automatically when PV voltage	< 4 V
In Auto Mode, Lights are OFF automatically when PV voltage	> 6 V
Number of retrials for Overload Condition check to permanently turn OFF the Lights and Mobile Charger.	8
Number of retrials for Short Circuit Condition Check to permanently turn OFF the Lights and Mobile Charger.	3
Delay time for Overload (150%) to occur i.e., to make Light / Mobile charger OFF after checking	5 secs
Delay time for Light/Mobile load to ON to check the retrial condition for checking Overload(150%) and Short Circuit after	10 secs

Solar Home Lighting System

Product Code: SLR-BL-LM-00000-00010

SPARKLE - Solar Home Lighting System

Su-Kam's Sparkle, the worlds smalles hybrid inverter has built-in batteries which works both with solar and grid. The external switch enables user to select bright or dim light. This Solar Home Lighting System with LED Bulbs is a cost effective lighting system that charges with both solar and main power and provides emergency backup via Lithium Ion Battery to power your needs.

Features
- Portable and lightweight
- Long life solar panel
- Hanging switch for convenient on/off function
- Wall/ceiling mountable for room light as well as fixes in table/reading lamp
- 2 brightness levels providing backup of 2.5 hours and 6 hours
- Fast AC grid charging- 3hours full charge
- Solar + Grid charging – 2 hours full charge in full sun
- Automatically converts to backup mode on power outage when light is on
- Red LED light indicator stays on during charging

Light Source
- High Efficiency LED: 120lm/W @ 120degree angle
- Cool white LEDs gives similar light as CFLs

Battery
- Integrated rechargeable, NO maintenance 3.7V, 0.55Ah lithium ion battery
- Overcharge and deep discharge protection on battery
- Low idle current (10A) allows light to be kept in unused state for weeks without going into deep discharge

Environmental
- ABS plastic body makes it shock and vibration proof
- Lightweight: 290gms

Applications
- Security Room
- Resorts
- Garden
- Study

TECHNICAL SPECIFICATION

Parameter	Units	Typical
Light output	Lux	5.2
Light output (battery @4.2V)	Lux	4.4
LED power consumption	W	0.8
LED Forward voltage	V	3
LED Forward Current	mA	40
LED Luminous Intensity	Lumen	14.5
LED Directivity	degree (2θ/2)	120
Solar Panels (Pm)	W	0.48
Solar Panel (Vm)	V	4.8
Solar Panel (Im)	mA	100
Solar charging - full sunlight	Hrs	7
Grid charging	Hrs	3
Solar + Grid charging - full sunlight	Hrs	2
Battery upper cutoff voltage (after stabilization)	V	4.25
Battery lower cutoff voltage (after stabilization)	V	3
Runtime (hrs) - hgih/normal	Hrs	2.5/ 6
idle current	µA	10
Dimension	mm	108 70 (I D)
Weight	gms	290
Power Supply Inout	Voltage	90 VAC-270VAC
Frequency	47Hz - 53Hz	47Hz - 53Hz
Inrush Current	50A Max	50A Max
Power supply output	Voltage	6V
Current	300mA	300mA
Protections	Max O/p Power (w)	1.8W

Product Code: SLR-BL-LM-00000-00011

SUNGLOW - Solar Home Lighting System

Next Generation Lighting

Su-Kam's Sunglow offers an innovative, energy efficient, and cost effective light solution. It is the world's lightest, multi-functional, plug and play room light that can be used for homes or any commercial applications. This next generation lighting provides 20-40% lower cost of ownership compared to emergency tube lights. With options for both solar and grid charging this state-of-the-art device also charges your mobiles and can run your radios uninterrupted.

Features
- Solar Charging
- Grid Charging
- Charges Mobile and runs Radio uninterrupted

Attractive Plug & Play Design
- Light weight and simple to install
- Palm size solar panel and light mounting clips allow portability
- Can be used as table lamp or wall mounting
- ABS plastic body makes it rugged and hard to break

High Quality And Reliability
- Solar panel with more than 10 years lifetime
- Super-efficient LED's with more than 3000 hrs lifetime
- Built in rechargeable lithium ion battery
- High efficiency electronics and thermal management

Customer Friendly
- Multiple Switch Provides flexibility over the amount of light and backup time
- AC option allows light to be used when grid is on
- Fast Charging on Grid. Better longer life
- Automatic Operation

TECHNICAL SPECIFICATION

Parameter	Units	Typical
Solar Charging – full sunlight	hrs	6
Grid Charging	hrs	3
Run time – high / low	hrs	3/15
Emergency Cell phone -1hr Charging	mins	30 mins talk time
Battery Nominal Voltage	V	3.7
Battery upper cutoff voltage (after stabilization)	V	4.25
Battery lower cutoff voltage (after stabilization)	V	3
Idle current consumption	A	10
LED Forward Voltage	V	3.5
LED Forward Current	mA	700
LED Luminous Intensity	Lumen	225
LED Directivity	degree (2 /2)	120
Power Consumption	W	4
Battery lifetime	Yrs	Min 1 yr
Dimension	mm	415×90×60 (l×w×h)
Weight (light only)	gms	210

Product Code: SLR-SC-VH-01200-00060

Sunbeam-DC System
Range - 5W to 60W

The home light system is a basic system which is used for house hold lighting. The system can charge the battery from solar panel with the help of inbuilt solar charge controller. It is a standalone system in which the connected battery is charged form solar power in the day time and then the battery backup is used in the night to light up the LED lamps

Present Situation

The present home light solutions with in built batteries have a limited amount of backup time as the size of the battery is usually fairly small. The solar panels that can be used with these also have limited capacity of around 5W to 10W. The local chargers do not have rugged design and the lack important reliable protection features such as overload, short circuit etc.

Solution

Su-Kam's SunBeam provides multi-functional solar home lighting solution to the user, it gives the flexibility to the user to use the system according to its application. The systems can take an input panel of upto 80W peak, battery capacity of 100Ah which can light upto 50W of DC load

Features

- The systems has a inbuilt solar charge controller that charges the battery with the help of Solar power from Panel..
- The package contains LED lamps with connecting cords, mobile charging cord (with variety of charging pins), along with this the connection wire for battery and PV wire
- Idle current of the system is zero, so the system does not draw the any current from the battery when it is battery low state or it is in off mode
- The system provides intelligent overload and short circuit protection to the system.
- The system also provides protection for low battery and high battery condition
- The system also has easy to understand LED display which shows the status of the system to user
- It is a compact and rugged design that can be kept on surface or can be hanged on the wall for installation

Application

SunBeam provides a flexible design to the user as the battery and panel rating can be used according to the application requirement

The system can be used as a low cost solution for house hold lighting especially for the areas where the mains availability is low or almost zero.

The system can be used as a mobile charging system

The system can be used for running various other DC applications such as Radio and Television with DC connections, DC fans under the recommended load condition for the load points can also be used

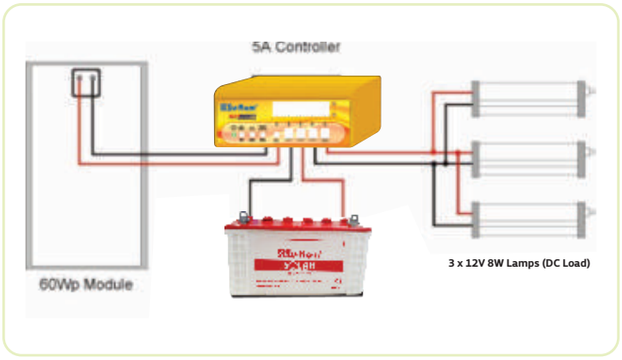
Backup Chart

System	Panel Rating	Battery	Total Load	Back Up
DC System 60 W	10 Wp	7.2 AH	5 W	7 Hrs
DC System 60 W	20 Wp	7.2 AH	10 W	6 Hrs
DC System 60 W	20 Wp	7.2 Ah	20 W	3 Hrs
DC System 60 W	20 Wp	20 AH	10 W	7 Hrs
DC System 60 W	40 Wp	20 AH	20 W	8 Hrs
DC System 60 W	40 Wp	40 AH	20 W	7 Hrs
DC System 60 W	40 Wp	20 AH	30 W	5 Hrs
DC System 60 W	50 Wp	60 AH	30 W	6 Hrs
DC System 60 W	40 Wp	20 AH	40 W	4 Hrs
DC System 60 W	85 Wp	40 AH	40 W	8 hrs
DC System 60 W	80 Wp	80 AH	45 W	6 Hrs
DC System 60 W	85 Wp	40 AH	50 W	7 Hrs
DC System 60 W	40wp	20 AH	50 w	3 hrs
DC System 60 W	85 wp	40 AH	60 W	5 Hrs
DC System 60 W	100 Wp	120 Ah	60 W	6 hrs

Load Chart

	A	B	C
LED 3W	2	2	2
LED 5W	3	3	1
Fan 25W	1	-	2
DVR 15W	1	1	-

Electrical	
Battery Voltage Rating	12 Volt Battery (35AH-50AH)
Solar PV Panel Recommended	80Wp
Maximum Battery Charging Current Limit	5A±0.5 A
Bulk Charging voltage	14.4 V ±0.2V
Float Charging voltage	13.7 V ±0.2V
Battery Low Cut	11.0V ± 0.2V (Load dependent)
Battery Low Reconnect	11.6V ± 0.2V (Load dependent)
High Battery Cut	15.5 ± 0.2 V
Idle current (Nominal)	0 A
Radio supply/Mobile charger V	5.8V ± 02 V (NLV).
Radio supply/Mobile charger I limit	300 mA
Over load Current (>100%)	>5.0 @ 12VDC
In Auto Mode, Lights are ON automatically when PV voltage	< 4 V
In Auto Mode, Lights are OFF automatically when PV voltage	> 6 V
Number of retrials for Overload Condition check to permanently turn OFF the Lights and Mobile Charger.	8 Times
Number of retrials for Short Circuit Condition Check to permanently turn OFF the Lights and Mobile Charger.	3 Times
Delay time for Overload (150%) to occur i.e., to make Light / Mobile charger OFF after checking	5 secs
Delay time for Light/Mobile load to ON to check the retrial condition for checking Overload(150%) and Short Circuit after	10 secs



Sunbeam-DC System
Range - Upto 120W

The home light system is a basic system which is used for house hold lighting. The system can charge the battery from solar panel with the help of inbuilt solar charge controller. It is a standalone system in which the connected battery is charged form solar power in the day time and then the battery backup is used in the night to light up the LED lamps

Present Situation

The present home light solutions with in built batteries have a limited amount of backup time as the size of the battery is usually fairly small. The solar panels that can be used with these also have limited capacity of around 5W to 10W. The local chargers do not have rugged design and the lack important reliable protection features such as overload, short circuit etc.

Solution

Su-Kam SunBeam Plus provides multi-functional solar home lighting solution to the user, it gives the flexibility to the user to use the system according to its application. The system can take load of 120W . It is an hybrid system with mains charger.

Features

- Its a DC system with an inbuilt MPPT charge Controller charges the battery with the help of solar power
- Hybrid system which works both with solar and grid
- Can take upto 120W of DC load
- Idle current of the system is zero, so the system does not draw any current from the battery when the battery is in low state or off mode
- System provides protection for low battery and high battery condition
- Compact and rugged design

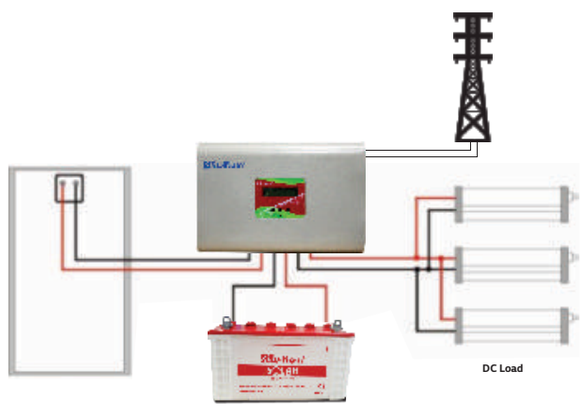
Application

Small rural household

Small household / shop

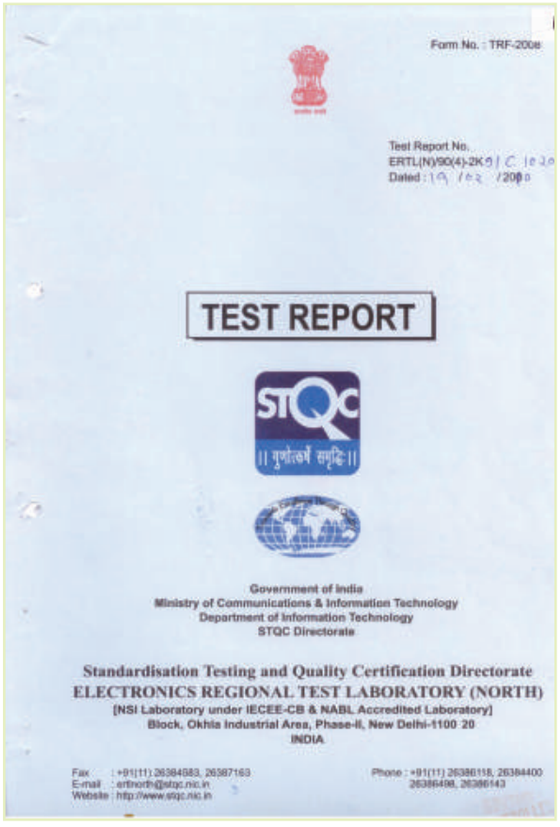
Load Chart

	A	B	C
LED 3W	5	-	5
LED 5W	3	4	6
Fan 25W	2	4	2
18" DC LCD 25W	1	-	1
DVR 15W	1	-	-



Electrical

Model No.	**SHLS12V120CG**
Nominal Battery Voltage	12 V
Charger rating	10A
Rated Load current	4.5A ± 0.5A
Maximum PV panel rating	12V DC system
Maximum PV panel rating	Typical: 120 Wp
	Maximum: 135Wp
Max. PV open circuit voltage	25Vdc
PV high and it's recovery	27Vdc/23Vdc ± 0.2V
Charging regulation	Four stage charging algorithm: Bulk, Absorption, Float and auto monthly Equalization
Bulk Charge	14.4V± 0.2V (settable 14.2V/14.4V/14.6V/14.8V)
Absorption period	Held batt. Voltage at bulk setting for a cumulative period of 2 hr.
Float voltage	13.8 V + temperature compensation
Equalization Voltage	Bulk Voltage + 1V (limited to 15.2V max.)
Automatic Temperature compensation	Yes,18mV to 30mV/°C for12V battery (25°C Reference)
Load Controller	1. Automatic Low Voltage Disconnect at 11.4V/11.5V/11.6V/11.7V±0.2V @ load 4A/3A/2A/4A resp.
	2. Automatic Low Voltage Reconnect at 12.8V±0.2V
	3. Automatic High Voltage Disconnect at 15.5V±0.2V
	4. Automatic High Voltage Reconnect at 14.5V±0.2V
PV array connect/reconnect points	PV connects when PV V > Battery V and disconnect when PV V < Battery V.
USB mobile charger point	4.8V±0.2V, 1nos. 400mA ±50mA
Protections Functions	
Load overload cut-off protection	Provided @ 5A± 0.5A & restart @ 3.5 minutes
Load Short Circuit Protection	Provided & restart @ 3.5 minutes
Vol. drop PV term. to Batt. term.	≤0.6Vdc (Not applicable when MPPT is working, it will come only in full duty mode of operation)
Standby Power Consumption	< 20 mA
Power Conversion Efficiency	>90 %
Grid Charger Specifications	
Grid charger Current	10A± 0.5A
Low cut	100Vac ± 20Vac
Low cut recovery	140Vac ± 20Vac
High cut	285Vac ± 20Vac
High cut recovery	280Vac ± 20Vac
Grid charging intelligent switching	Utility grid connects when battery voltage is <12V and PV current is ≤4Adc and disconnect when battery voltage reaches 14.2V and PV current is ≥2A and load current is less than PV current but if utility grid fails before battery attains 13.8V level and if resumes in between then charging from utility will restart without waiting battery voltage to be <12V.
Grid charger's input relay ON-OFF	ZVS with fast mains detection.
Indications: LEDs are provided for easy monitoring of the system.	
Visual Messages: LEDs are provided for easy monitoring of the system.	
Parameter	Messages
Solar PV related	PV Voltage , PV Current
Load related	Load current and Battery Voltage
Battery related	Battery Voltage, Battery Charge status in %, Battery Charging current and Battery discharging current.
Protection	PV Voltage high, PV current high, Batt. Low / High, over load, short circuit.
Recommended Loads to be connected:	
LED Light	3W, 2nos. and 5W, 1nos.
Fan	≤25W , 1nos.
Mobile charging point	4.8V±0.2V, 1nos. 400mA ±50mA



Form No. : TRF-2008

Test Report No.
ERTL(N)/90(4)-2K9/C 1020
Dated : 19/02/2010

TEST REPORT

Government of India
Ministry of Communications & Information Technology
Department of Information Technology
STQC Directorate

Standardisation Testing and Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
[NSI Laboratory under IECEE-CB & NABL Accredited Laboratory]
Block, Okhla Industrial Area, Phase-II, New Delhi-1100 20
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Government of India
Ministry of Communication & Information Technology
Department of Information Technology
Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

TEST REPORT NUMBER	DATE	DATE OF RECEIPT OF ITEM	DATE OF COMPLETION OF TESTING	PAGE NO.
ERTL(N)/90(4)-(2009-10)/C 1020	19/02/2010	03/02/2010	19/02/2010	1 of 7

1. Service Request Form	Number	6910002
	Date	01/02/2010
2. Customer	Name	M/S Sukam Power Systems Ltd
	Address	Plot No-34,Udyog Vihar, Ph-VI,Sector 37,Gurgaon Haryana
3.Manufacturer	Name	M/S Sukam Power Systems Ltd
	Address	Plot No-34,Udyog Vihar, Ph-VI,Sector 37,Gurgaon Haryana
4.Description of Item	Nomenclature	Solar PV Home Lighting System
	Make /Trade Mark	Sukam
	Model No./Type No.	HLS1210
	Number of sample/ Serial No.	01No. 901A08052215120900006
	Year of Manufacture	2009
	Condition	Good
5. Name & address where testing carried out (In-house/Subcontracting/Single window service/On-site/Using Customer Facilities)		ELECTRONICS REGIONAL TEST LABORATORY (NORTH) Okhla Industrial Area Phase-II, New Delhi-110020
6. Applicable standard/ specification		Customer's
7. Test Method/ Operating Procedure		Standard
8. Environmental Conditions	Temperature	27+2°C
	Relative Humidity	45-75%
9. No. of Annexures (If any)		Nil

Tested By
Vimal Arora
EM'II'

Approved By
(Authorised Signatory)

Issued By
Ved Prakash
Scientist'B'

Government of India
Ministry of Communication & Information Technology
Department of Information Technology
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ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

TEST REPORT NUMBER	DATE	PAGE NO.
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11. Test Results:

Sl.No	Cl. No.	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
7.0	—	**Mobile Charger Supply**	Shall be 5.8 +0.2V (Open circuit Voltage)	In-compliance For open circuit voltage. **When current is increased voltage droops to 1.75O3 at 279.45mA load.**	Satisfactory
8.0	—	**Solar PV Charger Efficiency**	Shall be 80% -5%	In-compliance 78.1% The testing for efficiency not has been carried out by using power supply for input power in place of Solar Photovoltaic panel. charger Output to battery has been taken as output power.	Satisfactory
9.0	—	**LED Lamp Wattage Consumption in whole battery Voltage**	Shall be 1.3W max	In-compliance	Satisfactory
10.0	—	**Short Circuit Protection**	Protection shall be provided	In-compliance	Satisfactory
11.0	—	**Reverse Current Flow From Battery to Solar array**	Protection shall be provided	In-compliance	Satisfactory
12.0	—	**Dry Heat Test at +40°C for 16hours**	Conditioning	conditioned	—

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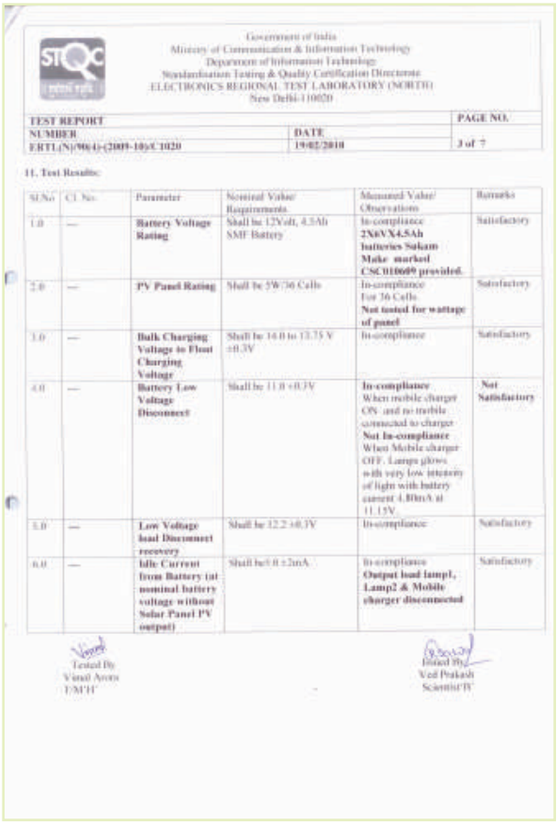

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TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2009-10)/C 1020	19/02/2010	3 of 7

11. Test Results:

Sl.No	Cl. No.	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
1.0	—	**Battery Voltage Rating**	Shall be 12Volt, 4.5Ah SMF Battery	In-compliance **2NSVX4.5Ah batteries Sukam Make marked CSC1110609 provided.**	Satisfactory
2.0	—	**PV Panel Rating**	Shall be 5W/36 Cells	In-compliance For 36 Cells **Not tested for wattage of panel**	Satisfactory
3.0	—	**Bulk Charging Voltage to Float Charging Voltage**	Shall be 14.0 to 13.75 V ±0.3V	In-compliance	Satisfactory
4.0	—	**Battery Low Voltage Disconnect**	Shall be 11.0 +0.3V	**In-compliance** When mobile charger ON and no mobile connected to charger **Not In-compliance** When Mobile charger OFF, Lamps glows with very low intensity of light with battery current 1.8hrA at 11.13V	**Not Satisfactory**
5.0	—	**Low Voltage load Disconnect recovery**	Shall be 12.2 ±0.3V	In-compliance	Satisfactory
6.0	—	**Idle Current from Battery (at nominal battery voltage without Solar Panel PV output)**	Shall be 0.0 ±2mA	In-compliance **Output load lamp1, Lamp2 & Mobile charger disconnected**	Satisfactory

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NUMBER	DATE	
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10. Details of Major Equipment used :

Sl. No.	Nomenclature	Make	Model/ Type No.	Calibration Valid up to
1	Power Analyser	Voltech	PM3300	19/02/2010
2	DMM	Fluke	87-III	23/12/2010
3	Climatic Test chamber	Aros hurley	ECS-130-40	28/10/2010
4	Climatic Test chamber	Weiss tech	C-340	19/12/2010

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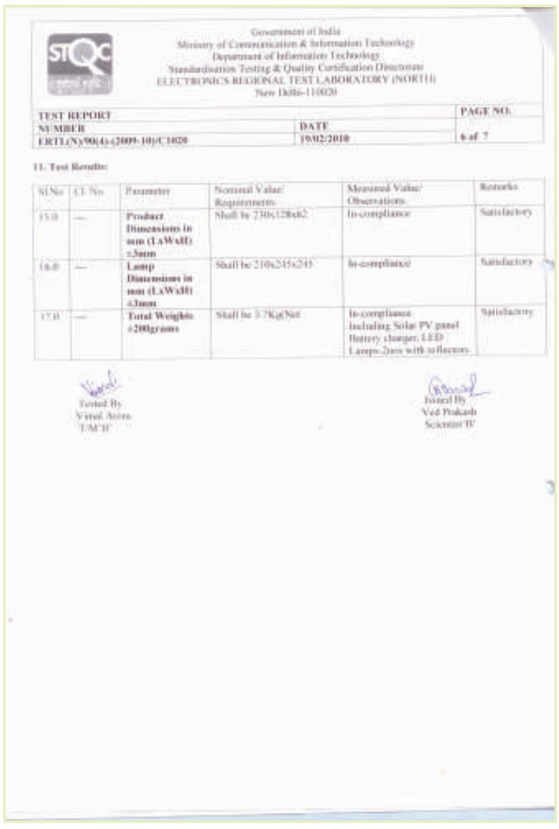

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TEST REPORT		PAGE NO.
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ERTL(N)/90(4)-(2009-10)/C1020	19/02/2010	6 of 7

11. Test Results:

Sl.No	Cl. No	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
15.0	—	**Product Dimensions in mm (LxWxH) ±3mm**	Shall be 230x128x62	In-compliance	Satisfactory
16.0	—	**Lamp Dimensions in mm (LxWxH) ±3mm**	Shall be 210x245x245	In-compliance	Satisfactory
17.0	—	**Total Weight± ±200grams**	Shall be 3.7Kg(Net	In-compliance Including Solar PV panel Battery charger, LED Lamps-2nos with reflectors	Satisfactory

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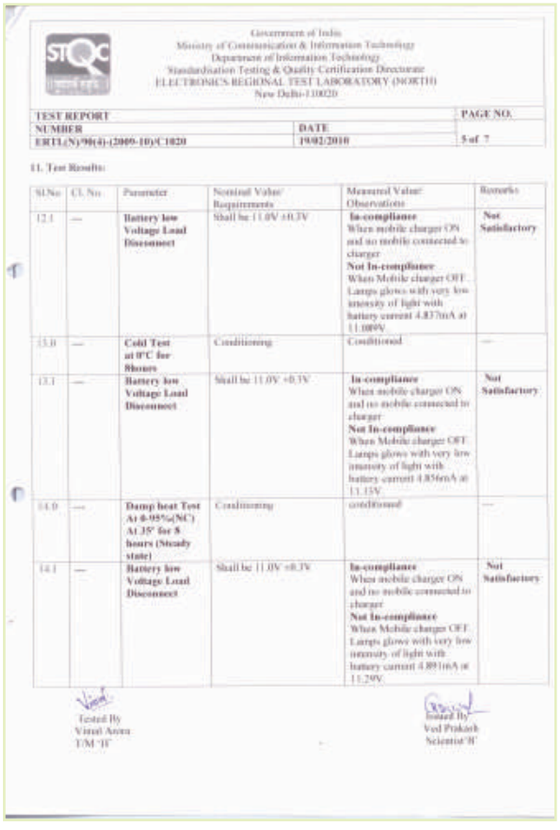

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TEST REPORT		PAGE NO.
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11. Test Results:

Sl.No	Cl. No	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
12.1	—	**Battery low Voltage Load Disconnect**	Shall be 11.0V ±0.3V	**In-compliance** When mobile charger ON and no mobile connected to charger **Not In-compliance** When Mobile charger OFF. Lamps glows with very low intensity of light with battery current 4.837mA at 11.089V	**Not Satisfactory**
13.0	—	**Cold Test at 0°C for 8hours**	Conditioning	Conditioned	—
13.1	—	**Battery low Voltage Load Disconnect**	Shall be 11.0V ±0.3V	**In-compliance** When mobile charger ON and no mobile connected to charger **Not In-compliance** When Mobile charger OFF. Lamps glows with very low intensity of light with battery current 4.856mA at 11.15V	**Not Satisfactory**
14.0	—	**Damp heat Test At 0-95%(NC) At 35° for 8 hours (Steady state)**	Conditioning	conditioned	—
14.1	—	**Battery low Voltage Load Disconnect**	Shall be 11.0V ±0.3V	**In-compliance** When mobile charger ON and no mobile connected to charger **Not In-compliance** When Mobile charger OFF. Lamps glows with very low intensity of light with battery current 4.8916A at 11.29V	**Not Satisfactory**

Tested By
Vimal Arora
UM'II'

Issued By
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Scientist'B'

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New Delhi-110020

TEST REPORT		PAGE NO.
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12. Remarks:

a) This Test Report pertains to item tested for the parameter(s) mentioned in the test results at Sl. No.11.

b) The item meets the requirements of customer's specification except the **Battery low Voltage Load Disconnect** (Sl. no. 4, 13.1, 14.1 & 15.1) parameter(s).

c) Uncertainty has been taken into consideration while declaring the results of the parameters in the test report.

d) Only Charger has been tested with LED Lamps 12X2 Nos. The Solar PV panel has not been tested for any electrical or photo voltage tests.

(Tested by)
Vimal Arora
UM'II'

Approved By
(Ashok Kumar)
Scientist'D'
(Authorised Signatory)

Issued By
FOR DIRECTOR

Form No. : TRF-2008

42

Test Report No.
ERTL(N)/90(4)-2K9/C.1161
Dated : 12.03.2010

TEST REPORT

Government of India
Ministry of Communications & Information Technology
Department of Information Technology
STQC Directorate

Standardisation Testing and Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
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Department of Information Technology
Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (NORTH)
New Delhi-110020

TEST REPORT NUMBER	DATE	PAGE NO.
ERTL(N)/90(4)-(2009-10)/C1161	12/03/2010	4 of 4

12. Remarks:

a) This Test Report pertains to item tested for the parameter(s) mentioned in the test results at Sl. No.11.

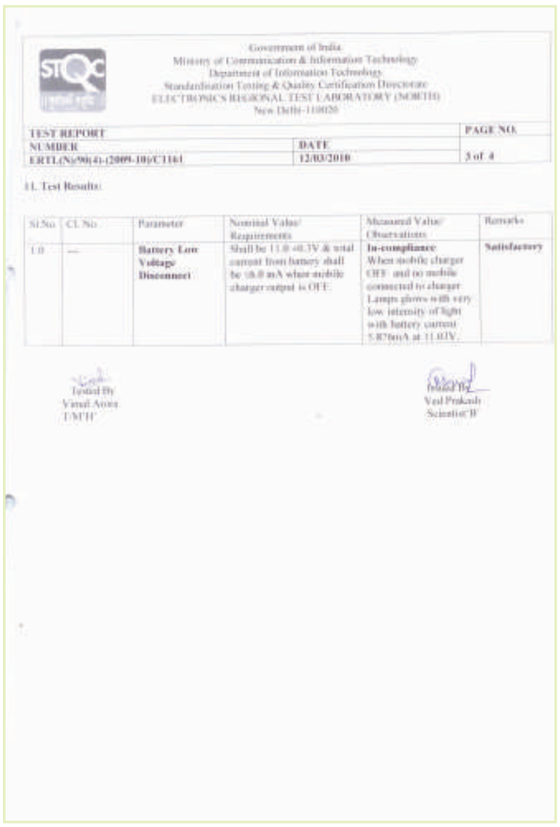
b) The item meets the requirements of customer's specification.

c) Uncertainty has been taken into consideration while declaring the results of the parameters in the test report.

(Tested by)
Vimal Arora
TM'II'

Approved By
(Ashok Kumar)
Scientist 'D'
(Authorised Signatory)

Issued By
FOR DIRECTOR



Government of India
Ministry of Communication & Information Technology
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TEST REPORT NUMBER	DATE	PAGE NO.
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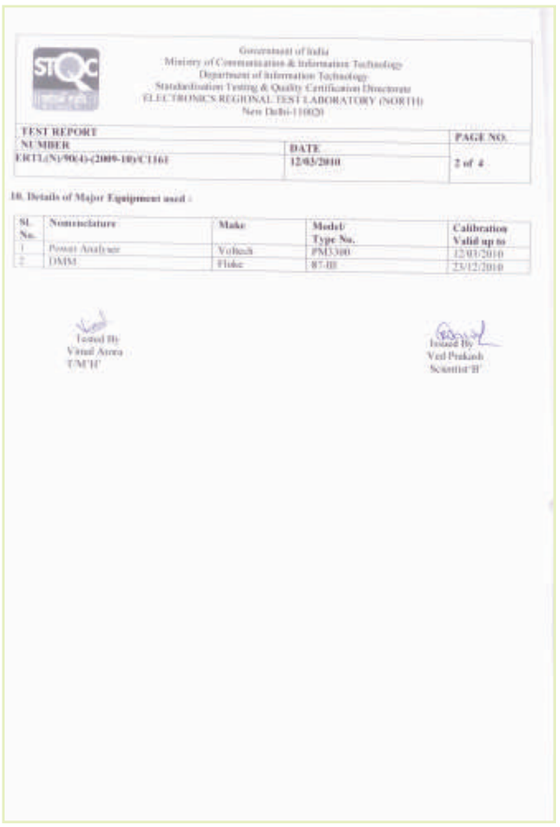
11. Test Results:

Sl.No	Cl. No	Parameter	Nominal Value/ Requirements	Measured Value/ Observations	Remarks
1.0	---	**Battery Low Voltage Disconnect**	Shall be 11.0 ±0.3V & total current from battery shall be ≤6.0 mA when mobile charger output is OFF.	**In-compliance** When mobile charger OFF and no mobile connected to charger Lamps glows with very low intensity of light with battery current 5.87mA at 11.03V.	**Satisfactory**

Tested By
Vimal Arora
TM'II'

Issued By
Ved Prakash
Scientist 'B'



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TEST REPORT NUMBER	DATE	PAGE NO.
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10. Details of Major Equipment used :

Sl. No.	Nomenclature	Make	Model/ Type No.	Calibration Valid up to
1	Power Analyser	Voltech	PM3300	12/03/2010
2	DMM	Fluke	87-III	23/12/2010

Tested By
Vimal Arora
TM'II'

Issued By
Ved Prakash
Scientist 'B'

SOLAR PROJECTS

Su-Kam has commissioned various solar projects in wide and diversified industries like

- Defense
- Educational Sector
- Corporates and Institutional
- Hospitals & Health Centres
- Petrol Pumps
- NGOs& CSR
- Street Lighting
- Banks

DEFENSE

1.3 MWp Solar Off-Grid Power Plants at various North Eastern locations of Assam Rifles – Indian Army

Assam Rifles project is a landmark project in the history of solar business at Su-Kam. The Project required Su-Kam to supply, install, commission and maintain off-grid solar power plants at various locations in **Manipur, Nagaland, Tripura, Mizoram & Assam states**.

The Assam Rifles Project was the 1st project undertaken by Su-Kam in powering up the headquarters of the Indian Army in the North East region of the country. The lack of adequate power supply at these remote locations had increased the dependence of the Army on cumbersome sources of power back up solutions like diesel generator sets with huge dependence on non-renewable sources of fuel like diesel.

Non-availability of adequate grid supply and poor quality & reliability of the same prompted the authorities of Assam Rifles to take up the alternate route of utilizing solar power solutions for their energy needs. The authorities realized that tapping renewable sources of energy was the only alternative way of tackling the twin problems of widening power deficits and mounting carbon emissions.

Details of the project

Total Plant Capacity: 1.3 MWp Off Grid Solar Power Systems with battery back-up have been installed by Su-Kam for Assam Rifles at various locations in Assam, Manipur, Nagaland, Mizoram & Tripura. Out of the 18 sites, 50 KWp solar installations have been made at each of the 10 sites with the remaining 8 sites having an installed capacity of 100 KWp at each of the sites. All the plants have been installed under MNRE subsidy scheme as per Jawaharlal Nehru National Solar Mission in India.

The 1st phase of the project which required Su-Kam to install 500 KWp of off grid solar power systems at 10 sites was completed in December 2012. Su-Kam completed the second phase installation of 800 KWp capacity of off grid solar power systems at additional 8 sites in March 2014.

As most of these sites were running on fuel guzzling & bulky diesel generator sets, the solar PV systems have brought down the dependence of these sites on generator sets thereby reducing the cost of diesel consumption by 50% of the initial cost of procurement and actual cost of the fuel!



EDUCATIONAL SECTOR

1 MWp Solar Grid-Tie Power System at Punjab Engineering College, Chandigarh

This is one of the prestigious projects bagged by Su-Kam through a tender process amidst huge competition from various other companies. This initiative of Su-Kam is in line with CREST's (Chandigarh Renewable Energy Science and Technology Promotion Society) master plan to make Chandigarh a green city through their solar city program

Details of the Project

Total Plant Capacity – 1 MWp Grid-Tie Solar Project (30 string Inverters of 30kWp ; 5 string Inverters of 20kWp; 4000 Solar Panels). Su-Kam is responsible for assessing the site, drawing out a detailed engineering plan and customized structure for setting up the system.

Benefit

The 1 MWp Solar Grid-Tie Solar installation will generate 13 Lakh units of electricity per year

100 KWp Solar Off-Grid Power Plant at Gates Institute of Technology, Andhra Pradesh

The Solar Power Plant Project by Su-Kam in Gates Institute of Technology is the largest private sector project for Solar in a South Indian institution. The Institute was facing regular problems of both irregular power supply & long power cuts.

Non-availability of adequate grid supply and poor quality & reliability of the same prompted the authorities of Gates Institute of Technology to take up the alternate route of utilizing solar power solutions for their energy needs.

Project Details

The Su-Kam team has designed, engineered and installed the 100 KW bidirectional rooftop solar power plant which is developed in-house. The solar power plant at the Gates Institute which was commissioned in March 2011 has been running solely on solar power with zero dependence on the electricity grid. The result is very low operational cost, clean & renewable energy usage and a greener environment

Benefit

100kWp system generates 1,82,000 units per year. The solar system helps the college to prevent the emission of 60 tons of carbon dioxide per annum..



50kWp Solar Grid-Tie System at Shivalik Public School, Patiala, Punjab

Su-Kam has commissioned a first–of- its- kind solar power plant at Shivalik Public School in Patiala, Punjab.

High electricity tariffs and hefty electricity bills made the school authorities look for an alternative solution for power that was value for money and which would enable them to run the entire school load at lower costs. The solar installation by Su-Kam has brought down the dependence of the school on electricity from the grid to zero!

Details of the project

The solar power plant installed by Su-Kam at Shivalik Public school has a highly structured setting of solar panels at the school's rooftop. The solar power plant has 6 string inverters of 8.5 kWp each providing a total capacity of 50 kWp. It is the first solar grid tie solar project undertaken by the company in Patiala.

With no recurring cost after 5 years, the inverter provided for the project is completely waterproof, aptly designed for outdoor applications, thereby requiring no additional internal space. Installed in a record time of 20 days, Su-Kam will be responsible for monitoring and maintenance of the newly installed solar power plant for the next five years.

Benefit

50kWp Solar Grid-tie system will generate approximately 60,000 to 72,000 units of electricity per annum and is equipped to handle the complete power load of the school during working hours. This in turn will reduce the school's dependence on grid power supply to nearly zero.


50 KWp Solar Grid-Tie System at National Institute of Technical Teachers Training & Research (NITTTR), Chandigarh

NITTR, Chandigarh falls under Ministry of Human Resource Development (the then Ministry of Education), Government of India. The institute is spread in a huge campus where the entire load runs from electricity supplied from the grid. Increasing electricity tariff led to huge expenditure which forced the institute to look for an alternative solution that is value for money and that reduces the electricity cost incurred to some extent

Project Details:

50 KWp solar grid tie system has been installed in the Homi Bhabha Academic Block at the National Institute of Technical Teachers Training & Research (NITTTR) in Chandigarh. The System comprises of 200 nos. of 200Wp solar panels, mounting structure, 2 Nos. of 20 Kw and 30 kw Grid Tie String inverters, Scada for remote monitoring, desktop and printer for data logging and water pump for cleaning of modules.

Benefits:

50 kWp Grid tie solar Photovoltaic system on the rooftop of the NIIITR building shall generate over 65 thousand units of electricity/year thereby helping NITTTR to save INR 4.5 lacs of electricity consumption



CORPORATE AND INSTITUTIONAL SECTOR

90 Kwp Solar Grid-Tie Solar Power Plant for EIL, Gurgaon

Engineers India Ltd (EIL) is one of the leading design and engineering organizations in South Asia. Su-Kam has supplied, installed and commissioned a 90 kWp solar power plant for the R&D building of Engineers India Limited (EIL) in Sector 16 in Gurgaon, Haryana in January 2014.

Project Details

The System comprises of 300 Nos. of 300Wp solar panels, mounting structure, 3 Nos. of 30 kWp Grid Tie String inverters, Scada for remote monitoring, desktop and printer for data logging and water pump for cleaning of modules. Entire project was installed, commissioned and shall be maintained by Su-Kam. The Su-Kam team has devised SCADA which is a data logging system provided for remote monitoring of plant performance on a regular basis including electricity generated, ambient temperature, wind speed, module temperature and solar irradiance. This remote monitoring system enables easy maintenance from a far off location. The solar system which was commissioned on 28th December, '13 was completed in a record time of 4 weeks.

Benefit

90kWp solar power plant will generate over 1.25 lakh units of electricity/year thereby helping Engineer India Limited (EIL) save over Rs 10 lakh rupees in electricity consumption annually.



45 kWp Solar Off -Grid Solar PV plant at Ujjayanta Market Complex, Agartala

Su-kam has installed and commissioned a 45 kWp solar off grid roof top power plant at Ujjayanta Market Complex, Agartala. Ujjayanta Market complex is a newly constructed building of Agartala Municipal Corporation. The project was a part of Tripura Renewable Energy Development Agency's plan (TREDA) to make Tripura one of the model solar states in the country.

Project Details

The System comprises of 180 nos. of 250Wp solar panels, mounting structure, 2 nos. of 65 KVA 360V Su-kam inverters, 4 nos. of 30 Am 360V Su-kam solar charge controller, 800 Ah batteries.

Benefit

The off grid 45 kWp-capacity Solar PV plant is one of the projects in the state government's ambitious plan to turn Agartala into a solar city in the coming years. 25% of the building's total requirement shall be met by the solar PV power plant installed in the market complex.



70 kWp Solar Grid-Tie Solar Power Plant fo NHPC, Faridabad

Su-kam has installed and commissioned a 70 kWp solar grid tie roof top power plant for the NHPC Phase-II office complex at sector-33, Faridabad. The foundation and module mounting structure has also been designed on the dead load concept with no penetration in the rooftop thereby avoiding any effect on the waterproofing of the roof by avoiding any damages to the same. The solar system which was commissioned on 25th March, '13 was completed in a record time of 3 weeks

Project Detail

The System comprises of 280 nos. of 250Wp solar panels, mounting structure, 2 Nos. of 30 kW, 1 no. of 20 kW Grid tie String inverters, Scada for remote monitoring, desktop and printer for data logging and water pump for cleaning of modules

Benefits

70 kWp Grid tie solar Photovoltaic system on the rooftop of the NHPC building shall generate over 84 thousand units of electricity/year thereby helping NHPC corporate office to save INR 6 lakhs of electricity consumption annually!


35 kWp Solar Off-Grid Power plant at Vanbhavan, Nagpur (Maharashtra)

Su-Kam has installed and commissioned a 35 kWp solar standalone roof top power plant at Vanbhavan, Nagpur. Vanbhavan is the Head office of Maharashtra Forest Department. The project was a part of Maharashtra Energy Development Agency's plans (MEDA) towards adopting Green Energy. The off grid 35 kWp-capacity Solar PV plant is one of the projects in the state government's ambitious plans to turn Nagpur city into a Green city through Solar in the coming years.

Project Details

The System comprises of 141 nos. of 250Wp solar panels, mounting structure, 1 nos. of 50 KVA 360V Su-

Kam Inverter, 3 nos. of 30Amp/360V Su-kam Solar Charge Controllers, 1360Ah/360V battery bank. Su-Kam has also installed Water Distillation Plant through which distilled water can be prepared and can be used for Battery Water Topping.

Benefit

The total energy consumption of the building is 80 kW and 45% of the building's total requirement shall be met by the solar PV power plant installed at Vanbhavan building.



HEALTH CARE

Varma Nursing Home - Off Grid Solar Power Plant

Varma Nursing home, one of the oldest nursing home located in Gaya, a small town in Bihar, had a major problem- power cuts and the DG sets were neither a permanent solution nor cost-effective.

In this scenario, the Nursing Home authority showed interest in Solar Power but the high expenditure to runthe entire Hospital on Solar discouraged them.

Project Details

Varma Nursing Home installed 5 solar power plant of 4kva and 1 solar power plant of 3kva pcu that has resulted in the smooth functioning of the hospital without any hurdle. Apart from lighting up Varma Nursing Home and their hope, the solar power also helps run X-Ray Machines, Ultrasound, Patho Lab, Sterilization, Induction Cooker, Fans, Lights and AC without any interruption. Su-Kam helped the Nursing Home set up the entire infrastructure in record time. Su-Kam experts also guided the project all along and made surethere were no glitches.

Benefit

Entire hospital on free electricity with 100% dependency.



Lalitha Nursing Home (Warangal, AP) - Off Grid Solar Power Plant

Located in the rural part of Parakal, Warangal, LALITHA NURSING HOMis a major hospital that offers state-of-the-art services through multi-specialty equipments but at lower fares. But like all other rural hospitals, even LALITHA NURSING HOME faced acute power cuts & shortages, which is a common problem in India.To maintain regular power supply, the hospital authorities were paying 60,000/- for diesel and generator sets.

Project Detail

10KW system on easy EMI and thereafter added another 5 KW system on the rooftop.

Benefits

After installing the solar plant, it served as a critical life-support system for thehospital, they have entirely done away with the DG sets to power the hospital for 8 hours of backup, each day.The hospital has not only reduced the cost of expensive diesel used in Gensets but has also availed subsidy and tax

depreciation for using solar power, ROI (return on investments), zero dependency on electricity and DG sets, and no unwanted power cuts. Now their hospital runs on clean and uninterrupted power backup using the renewable energy resource of the sun.



STREET LIGHT

Street Lighting Project for TEDA

Su-Kam has carried out street lighting project of Tamil Nadu Energy Development Agency's (TEDA). It is the first project in India for Centralized Street Lighting System. The project is spread across seven districts in western Tamil Nadu including the rural belt of the state.

Project Details

First phase - In this phase of the project a 500 Watt inverter along with battery backup is installed at the location that provides supply to a cluster of 10 street lights. The model involves retrofitting a cluster of existing street lights and energizing them from a central SPV Power Plant with provision for grid back and distribution through Tamil Nadu Generation and Distribution Corporation Limited (Tangedco),

Second phase – In this phase of the project a 600 Watt inverter along with battery backup was installed at the location that supplies power to a cluster of 15 street lights. The model involves retrofitting a cluster of existing street lights and energizing them from a central SPV Power Plant with provision for grid backup and distribution through Tamil Nadu Generation and Distribution Corporation Limited (Tangedco),

Benefit

First phase - The project lights up 3220 street lights through 322 numbers of 500 Wp Solar Power Plant. This is currently being installed in the rural areas of Tamil Nadu.

Second phase – The project lights up 3495 street lights through 233 numbers of 500 Wp solar power plant. This is currently functional in seven districts in western Tamil Nadu including Salem, Erode, Karur, Namakkal, Coimbatore, nilgiris etc.


Complete Solar Generating Unit


Street Light


System Cabinet with Lock

Solar Street Light Project – Loyola Arts College, Chennai

Su-Kam in association with its channel partner successfully implemented the 'LED Street Light' project at Loyola Arts College, Chennai.

Project Detail

The entire compound is lit up by installing 67 nos. of 10.8 Watt LED DC lights with 50 AH battery and 50 Watts solar panel. This solar installation replaced hundreds of CFLs which were earlier installed thereby resulting into huge savings. It is a totally stand-alone system and is

independent of the Grid. With the success of this project which is a model example towards taking the first step towards adopting new and renewable energy, a number of corporate and educational institutions are now approaching Su-Kam for installing a greener set up for their energy usages.

NGOs & CSR

Lohia Awas Project - an initiative to electrify 40,000 rural households

Su-Kam has recently bagged a first of its kind large scale solar project in Uttar Pradesh. The project is a part of UPNEDA's Lohia Awas Project wherein the government plans to electrify 40,000 rural household in the state. The company has bagged this prestigious project after winning a tender from UPNEDA

Project details

Installation of Solar PV power packs which comprises of 3nos of LED lights (2LEDs of 3W & 1LED of 5W), 1 DC Ceiling fan (25W) and 1 solar charge controller with mobile charging point in each of the rural houses.

Benefits

The project aims to provide electricity to these households in the span of 1 year.



Solar powered Green House Scheme – An initiative to electrify 3 lakh rural houses over a period of 5 years (by 2016)

Su-Kam Power Systems, leading power back up solutions provider in India, has till date, successfully installed solar power systems in over 10000 houses in 7 districts of Tamil Nadu under the Chief Minister's Green House program launched by TEDA (Tamil Nadu Energy Development Agency). The company shall be making 2500 additional solar installations under this phase of the project by April 2014.

Project details

Installation of Solar PV power packs which comprises of PV Panel; PCU, Battery and CFL.

Benefits

The project aims to provide electricity to these households in the span of 5 years.



Rural electrification of 300 houses - BAIF Development Research Foundation, NGO

Su-Kam in collaboration with BAIF Development Research Foundation, an NGO has adopted a village which has close to 300 houses with an objective to electrify these households

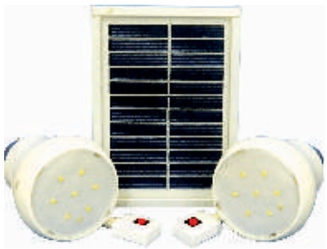
About the Initiative

300 Solar Home Lighting System to be installed in 300 houses

Benefits

The project aims to provide electricity to these households in the span of 1 year. Project star date – May 2014

Advit Foundation, an NGO



Su-Kam supports Advit Foundation, an NGO in their initiative to promote renewable energy across communities. The NGO in is a non-government development organization based in Gurgaon, India working for Environmental Conservation and Livelihood Enhancement. Advit seeks to empower the industry and communities through various viable options for sustainable development. It provides a platform for skill enhancement, capacity building and natural resource conservation through participatory approaches

About the Initiative

Advit in collaboration with Su-Kam has electrified more than 40 village by installing solar LED lights at subsidized costs.

INTERNATIONAL PROJECTS

Gabon Street Lighting Project

Su-Kam has made rapid strides in lighting up remote villages in Gabon, one of the many power starved nations in Africa, with the power of solar energy. The company has installed solar street lighting systems in various remote villages of Gabon, inhabitants of which are Bushmen and animal hunters who had never seen electricity before..

Project Details

Su-Kam has installed 2000 solar street lights in the remote villages of Kango (350 kms from Libreville), Mouila (1200 kms from Libreville) and Bitam (900 kms from Libreville) in Gabon (Libreville is the capital and largest city of Gabon, in west central Africa). The solar PCUs developed and installed by Su-Kam in these areas work on the "Dusk to Dawn" technology and automatically regulate lighting of street lights after sundown. The Su-Kam team faced several challenges during installation like lack of skilled manpower, no roads for transporting raw material, inhospitable terrains & weather, scarcity of food & unavailability of tools etc.

Benefits

Prior to installation of these solar street lights, the villagers used to end their day and stop all activity post sundown in the absence of electricity. However, Su-Kam has given new life to the villagers who have now access to both electricity and employment with the effort of the solar team of Su-Kam

Off-Grid Solar solutions in 35 schools in remote areas of Rwanda, Africa

Su-Kam has recently bagged a turnkey solar project covering 105 sites in Rwanda, Africa through the Ministry of external affairs, Govt. of India. Rwanda, officially the Republic of Rwanda, is a sovereign state in central and east Africa. Located a few degrees south of the Equator, Rwanda is bordered by Uganda, Tanzania, Burundi, and the Democratic Republic of the Congo.

Project Details

Su-Kam shall supply, install and commission Solar Photo Voltaic equipment and associated items for 35 schools in remote areas of Rwanda. The company would light up 35 schools with PCU Packages, 35 solar packages and 35 Home lighting. It will be responsible for pre-installation survey of the site and drawing out a detailed engineering plan. Su-Kam shall also provide a warranty of 1 year post the completion of the project. The Su-kam officials shall also provide onsite training on operation & maintenance (O&M) to the personnel/staff/technicians of Rwanda.

Hybrid Solar Solutions in Remote Villages of Malawi, Africa

For the last seven years, a team from Su-Kam has been quietly at work in the African nation of Malawi, one of the most under-developed regions of the world. The team has successfully installed electricity powered by wind and solar energy for the first time for the inhabitants of five remote villages: Chigundu, Mdayaka, Eluyumi, Kumbande and Kadzuwa.

The team observed and analysed the conditions in the villages and decided to go in for a hybrid system – a combination of solar and wind energy. The wind speeds in these villages were found to be around 5 metres per second, adequate to generate electricity. Sunshine is also in abundance. The usage of the windmills succeeded in bringing down both the costs of the project and the space requirements of the installations.

Windmills generate electricity through the conversion of mechanical energy to electrical energy. The wind rotates the blades of the windmill. Its shaft is connected to an inverter, which converts the mechanical movement of the blades to electricity.

Project Details

In each village, Su-Kam has installed 3 wind generators of 4.2 kW each, along with solar photovoltaic modules of 24 V / 150 W, generating 7.5 kW. All told, the systems are generating 20.1 kW for around 150 households in each village.

Off-Grid Solar Power Solution at KCB Bank in Juba, South Sudan

Non-availability of adequate grid supply is the biggest challenge in South Sudan. Genset as an alternative is expensive due to increasing fuel cost. Hence, the fuel cost & huge maintenance cost prompted the KCB Bank in South Sudan to look for an alternative cheaper source of energy.

Project Details

Su-Kam installed a 6KVA PCU with 200Ah Battery Bank along with Solar Panels to run the critical load i:e CCTV Camera , ATM Machine and server. In the evening, PCU takes over the load and provides back-up overnight. PCU with SGB option helps to keep the batteries fully charged till mains power is available.

Benefit

Solar system eliminates the regular use of generator sets resulting in huge savings on the fuel cost.

Solar Telecom project, Afghanistan

In the rugged, mountainous terrains of insurgency hit Afghanistan, Su-Kam is making its presence felt with its technology and the company is contributing significantly towards the growth of the telecommunications sector in Afghanistan. An official department of the Government of Afghanistan assigned Su-Kam the mandate for installing communication towers across 17 provinces out of 34, powered entirely by solar energy; with a diesel generator on site to serve as a standby. Of the 17 sites, 15 are designed to deliver a back-up period of 3 days in a row, with no solar power at all. The remaining 2 sites will deliver a back-up period of 5 days. Su-Kam provided the entire solar power solution on a turnkey basis. The company won this coveted contract pitching against global competition.

Project Details

Su-Kam has installed the following systems in Afghanistan: The heart of the solar system is Su-Kam's innovative Power Conditioning Unit (PCU) along with built-in charge controller and Solar Panels (monocrystalline) Cells.

Benefit

Uninterrupted solar power supply to telecom towers used for communication within govt. departments across 17 provinces.

POWER ACCESSORIES

Su-Kam's wide range of easy-to-use and reliable power accessories have been designed keeping in mind the customers' various needs to increase the life of appliances, store them easily and save then from any unwarranted harm during maintenance .

To meet all the aforementioned needs, Su-Kam has designed power accessories such as Power Guard that saves appliances from sudden voltage and current surges; Battery Equalizer that helps to increase the life of batteries by balancing them; Battery Water Topping Kit that enables easy water topping of batteries preventing acid spillages and burns; Battery Trolley to provide an easy, contemporary, neatly designed storage space for batteries.

All these product accessories are highly essential in the day-to-day life of a customer in fulfilling his power back up needs; it makes his life easier by giving him easy solutions on a common platform.

POWER GUARD

Product Code: PWR-BL-TD-110AA-00006
PWR-RD-TD-110AA-00006
PWR-WH-TD-110AA-00006
PWR-YL-TD-110AA-00006

POWER GUARD - 6Amp

Driven by Microprocessor Chip Technology, Su-Kam's Power Guard increases efficiency and acts as an insurance against power fluctuations that could damage electrical appliances and electronic devices in the long run. The functionality of Power Guard is to detect and protect electrical appliances and electronic devices against high voltage, low voltage, surges, spikes and frequency variations. Power Guard enables stabilized voltage supply to the connected electrical appliance and electronic device, increasing its longevity and minimizing the risk of damage.

Product Features

- **Universal Plug-in :** Adaptable to American plug - 2/3 Flat Pin, adaptable to UK plug - BS1363 and adaptable to Indian plug - Round Pin BS 546 (Operates both at 110V & 220V) No adapters required thus no additional cost incurred.
- **Portable Technology :** Universal Reception System install.
- **Voltage Cut-off Display (VCD):** Displays voltage cut-off and voltage supply - Auto Restoration. It also rescues electrical appliance from breakdown and acts as insurance against power fluctuation.

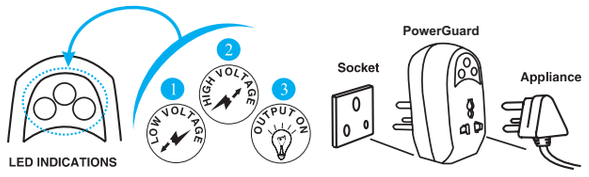
Product Features

- **Zero Voltage Switching (ZVS):** This acts like a life insurance for electrical appliances. It also guarantees longevity of the components inside the electrical appliances.
- **Zero Power Consumption (ZPC):** It reduces the energy consumption by 11.5%

TECHNICAL SPECIFICATIONS

Operating VoltageRange	110Vto270VAC
Customised Operating VoltageRange	Other ranges available onrequest
OperatingFrequency(50Hz)	45to55Hz
OperatingFrequency(60Hz)	55to65Hz
SuperiorSpikeProtection SurgeCurrent(8/20µS)	Available 2500A
OperatingAmbient	0°Cto45°C
RelativeHumidity	95%(Non-Condensing)
Dimensions(mm)	49.1x53.5x111(WXDXH)
Weight(Grams)	92

INSTALLATION DIRECTIONS



- Plug input power cord from electrical appliance into Power Guard socket.
- Plug Power Guard into a socket having an earthing system.
- Switch ON the power supply.
- Lighting of LED 3 indicates voltage supply is in specified safe limits & electrical appliance is functional.
- Lighting of LED 2 indicates that input supply is high and Power Guard has disconnected & saved the appliance.
- Lighting of LED 1 indicates that voltage input supply is low & Power Guard has disconnected & saved the appliance.

POWER GUARD

Product Code: PWR-RD-TD-180AC-00016
PWR-BL-TD-180AC-00016
PWR-WH-TD-180AC-00016
PWR-YL-TD-180AC-00016

POWER GUARD - 16Amp

Driven by Microprocessor Chip Technology, Su-Kam's Power Guard increases efficiency and acts as an insurance against power fluctuations that could damage electrical appliances and electronic devices in the long run. The functionality of Power Guard is to detect and protect electrical appliances and electronic devices against high voltage, low voltage, surges, spikes and frequency variations. Power Guard enables stabilized voltage supply to the connected electrical appliance and electronic device, increasing its longevity and minimizing the risk of damage.

Product Features

- **Universal Plug-in :** Adaptable to American plug - 2/3 Flat Pin, adaptable to UK plug - BS1363 and adaptable to Indian plug - Round Pin BS 546 (Operates both at 110V & 220V) No adapters required thus no additional cost incurred.
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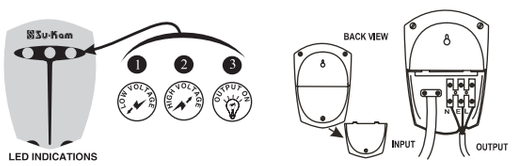
Product Features

- **Zero Voltage Switching (ZVS):** This acts like a life insurance for electrical appliances. It also guarantees longevity of the components inside the electrical appliances.
- **Zero Power Consumption (ZPC):** It reduces the energy consumption by 11.5%

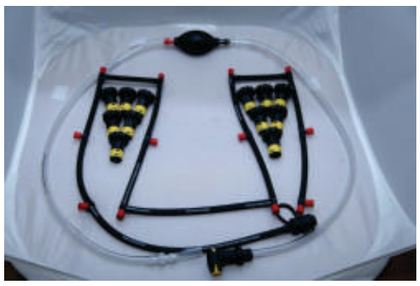
TECHNICAL SPECIFICATIONS	
Operating VoltageRange	180Vto260VAC
Customised Operating VoltageRange	Other ranges available onrequest
OperatingFrequency(50Hz)	45to55Hz
OperatingFrequency(60Hz)	55to65Hz
SuperiorSpikeProtection SurgeCurrent(8/20µS)	Available 2500A
OperatingAmbient	0°Cto45°C
RelativeHumidity	95%(Non-Condensing)
Dimensions(mm)	81.5x37.5x115(WXDXH)
Weight(Grams)	300

INSTALLATION DIRECTIONS



- First tightly connect the input power cord of the electrical appliance to the output connecting terminal of the Power Guard 16 amp.
- Next provide a good, tight, secure connection, free of any play to the input lead-cable wire of the Power Guard to the AC mains having an earthing system. Do ensure the earthing.
- Switch on the power supply only after making the above mentioned tight connections
- Lighting of LED 3 indicates voltage input supply is in specified safe limits & electrical appliance is functional.
- Lighting of LED 2 indicates that input supply is high and Power Guard has disconnected & saved the appliance.
- Lighting of LED 1 indicates that voltage input supply is low & Power Guard has disconnected & saved the appliance.

BATTERY WATER TOPPING KIT



Product Code: BAT-WK-00-00000-00001, BAT-WK-00-00000-00002
BAT-WK-00-00000-00003, BAT-WK-00-00000-00004
BAT-WK-00-00000-00005, BAT-WK-00-00000-00006

BATTERY WATER TOPPING KIT - 1 Battery, 2 Battery & 4 Battery

Su-Kam's Battery Water Topping Kit makes the tedious task of battery water filling, a safe, easy and reliable process. Consisting of automatic shut-off valves, interconnected with tubing which replace the existing vent caps, this kit not only saves time and labour cost but also ensures extended battery life and safety from acid burns and spillages.

Product Features

- **Uniform Electrolyte Level :** The Battery Water Topping Kit ensures equal electrolyte level in all the cells through pressure valves which shut on attaining the required level of the electrolyte.
- **De-gas Chamber :** The valve allows each cell to vent gases effectively. Gases leave the cell through the de-gas chamber separated from the incoming water.
- **Single Point Multi Feeder :** Battery Water Topping Kit fills water accurately in multiple cells with the help of one single point feeder tube.
- **Clampless Tube :** Easy to install with high flexibility and maneuverability.

Operation

- **Important :** Batteries may only be filled after charging.

  Insert the Hand Pump into a bottle of distilled water. The bottle should always be kept at a level/height which is below the water topping system's valves.
- Prime bulb by squeezing until filled with water.
- Once bulb is primed remove the dust cover from the battery watering system. Mate the couplers.
- Squeeze the bulb with firm pressure to pump water into the battery cells. When the bulb becomes firm, all cell are full.
- Immediately disconnect the couplers. Replace the dust cover.

Benefits

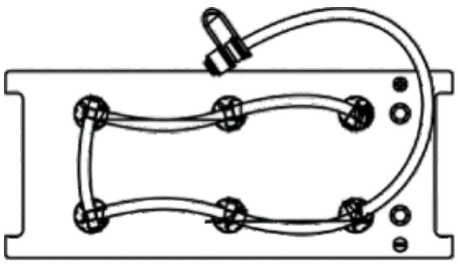
- **Cost Savings :** It saves your labor cost. After installing your Battery Water topping system you will realize other cost benefits including extended battery life, increased performance, cleaner floors, equipment and battery tops.
- **Safety From Burn :** Fill batteries without having to remove the vent covers. No Battery Acid Burns, Ruined clothing & noxious fumes.
- **Extended Battery Life & Performance :** A properly watered battery lasts longer and performs better. Overfilling a battery results in loss of acid, while charging with low electrolyte levels will result in permanent damage to the lead plates. Both will result in loss of capacity and life expectancy.
- **Time Saving Convenience :** Snap on/snap off water connections and fast filling turn the often ignored task of watering batteries into a quick, simple task allowing you to fill each battery in 60 seconds or less!
- **Install It And Forget It :** No need to remove the Water topping kit once it is installed with Battery. You can keep this battery from 0 to 65 degree Celsius without any fear of degradation of the assembly.

LA Battery

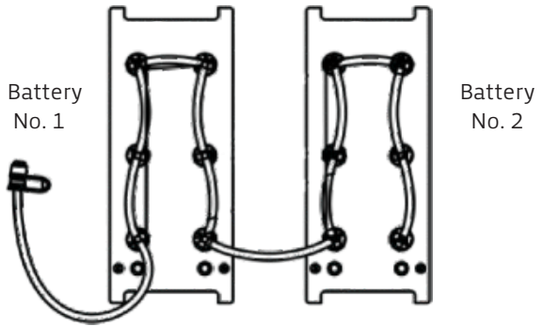
Tubular Battery

Tubular Battery

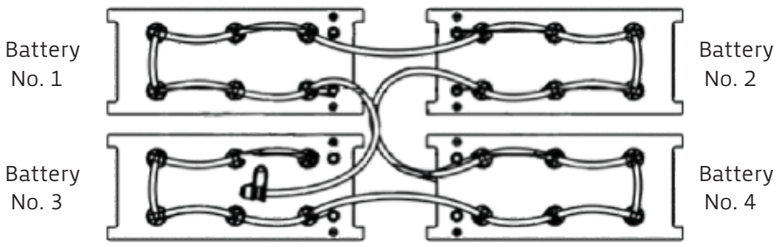
LEAD ACID BATTERY INSTALLATION DIAGRAMS



6 Cell / 12 Volt Layout (Lead Acid Battery)

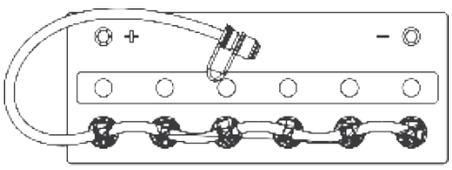


12 Cell / 24 Volt Layout (Lead Acid Battery)

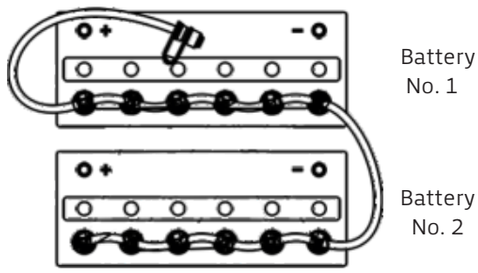


48 Cell / 48 Volt Layout (Lead Acid Battery)

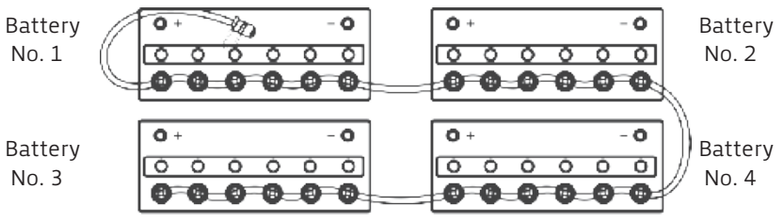
TUBULAR BATTERY INSTALLATION DIAGRAMS



6 Cell / 12 Volt Layout (Tubular Battery)



12 Cell / 24 Volt Layout (Tubular Battery)



48 Cell / 48 Volt Layout (Tubular Battery)

BATTERY CHARGER

Product Code: BTC-OT-00-012AA-00010
BTC-OT-00-024AA-00009
BTC-OT-00-048AA-00008

BATTERY CHARGER - 12V, 24V 48V to 96V

Su-Kam's SMPS based, multistage, pure DC battery chargers are microprocessor controlled for fast and accurate charging of all deep-cycle batteries. A wide AC input voltage range enables proper delivery of a full three-stage charge, even when charging from less than perfect quality grid power or generator power.

Principle : Su-Kam HUPS are innovative two in one products which eliminate the need to have separate power backup system for home equipment & computers.

Product Features

- Switching mode control (SMPS) based design
- Charges batteries with constant voltage constant current
- Protection against the reverse polarity of battery
- Automatic over current limit
- Alphanumeric LCD panel for user-friendly interface for 48V systems and LED display for 12V and 24V systems.
- SMPS based Constant Current Constant Voltage Charger Working at 50KHZ
- User-friendly operation and High efficiency
- Covered terminal block with screw terminals for safe and easy connection.
- Over voltage, under voltage and over current protection
- Easy battery connection with clip leads
- Intelligent Thermal Management

Application

- Sealed Maintenance Free Inverter and UPS Batteries
- Lead Acid Inverter and UPS Batteries
- Automotive Batteries

BATTERY EQUALIZER

Product Code: BTE-EQ-00-02400-00000
BTE-BU-00-04800-00000
BTE-BU-00-00800-00000

BATTERY EQUALIZER - 12V, 24V, 48V

The Su-Kam Battery Equalizer is a unique product from the Su-Kam stable that equalizes two or more batteries in a battery bank connected in series and corrects their imbalances. Battery Equalizer enhances the battery's life by preventing under charging and over charging of the batteries. The Su-Kam Battery Equalizer is a patented technology which provides perfect voltage matching of the batteries during both charge and discharge, bringing longer life cycle, lower rates of failure and easy maintenance.

Principle : Su-Kam HUPS are innovative two in one products which eliminate the need to have separate power backup system for home equipment & computers.

Product Features

- Active equalization technique based on flash micro controller.
- Reduces the battery replacement, which again greatly reduces the cost.
- Easy to install with batteries connected in series.
- Suitable for 'N' numbers of batteries by utilizing multiple units together.
- Operates in all three modes: battery charging, discharging or in idle mode.
- Appropriate for Gel, Sealed and AGM Lead Acid batteries.
- Works with conventional flooded lead acid batteries and SMF batteries.
- Extends battery life and run time.
- Prevents over and under charge due to battery imbalance.

Benefits

- When there are more than 2 batteries in the series, it will equalize the voltage in them and ensure they do not have different voltages.
- Protects your batteries from undercharging and overcharging, which reduces their working life.
- Extends battery life and capacity appreciably.
- Reduces the frequency of battery replacement, thus reducing cost and saving money.
- Easy to install with batteries connected in series.
- Operates in all 3 modes: battery charging, discharging or in idle mode.
- Compact size, low weight.

Application

- Battery Bank
- Electric Vehicles
- Solar Systems
- Generators
- Trucks & Buses etc

BEQ 24V

BEQ 48V

Glossary

Alternating Current (AC) – An electric current that reverses direction periodically

Angle of Incidence – The angle at which the light rays strike the earth's surface

Anti-Reflection Coating – A thin coating of a material that is applied to a Solar PV surface to reduce the light reflection and increases light absorption

Array – A number of Solar PV modules connected together electrically, to provide a single electrical output. (Also Solar PV panels)

Blocking Diode – A diode used to prevent current from flowing towards a failed Solar PV module or from a battery to the Solar PV array during periods of darkness or low current production

Bypass Diode – A diode connected in parallel with a Solar PV module to provided an alternative current path (by-pass) in case of module shading or failure

Cell - A Solar PV cell (also called photovoltaic cell) is a solid state device that converts the energy of sunlight directly into electricity by the photovoltaic effect

Charge Controller – A device in a Solar PV system that controls the charging rate and/or state of charge for batteries

Converter – A device used in Solar PV systems to convert electrical direct current (DC) voltage to another DC voltage

Diffuse Radiation – Radiation received from the sun after reflection and scattering by the atmosphere and ground

Diode – Electronic component that allows current flow in one direction only (Also Blocking Diode and By-Pass Diode)

Direct Beam Radiation – Radiation received by direct solar rays

Direct Current (DC) – Electric current flowing in only one direction

Efficiency – The ratio of output power (or energy) to input power (or energy) expressed as a percentage

Electricity Grid – An electricity distribution network (Also Grid)

Feed in Tariffs - Feed in tariffs is a government sponsored incentive scheme designed to encourage the introduction of renewable energy sources

Flat Plate Array – A PV array that consists of non-concentrating Solar PV modules

Grid – A transmission line electricity distribution network (Also Electricity Grid)

Grid Connected System – A Solar PV system in which the array acts like a central generating plant, supplying power to the electricity grid. (Also Grid-Tie System and On-Grid)

Hybrid System – A Solar PV system that includes other sources of electricity generation, such as wind turbines, small hydro or diesel generators

Insolation – The solar radiation incident on an area over time. Equivalent to energy and usually expressed in kilowatt-hours per square metre

Inverter – In a Solar PV system an inverter converts Direct Current (DC) to alternating Current (AC)

Irradiance - The solar power incident on a surface. Irradiance is usually expressed in kilowatts per square metre. Irradiance multiplied by time equals insolation

I-V Curve – The plot of current versus voltage characteristics of a Solar PV cell, module or array. Three important points on the I-V curve are the opening-circuit voltage, short-circuit current and peak power operating point

Kilowatt (kW) – A unit of power equal to one thousand Watts

Load – Is the amount of electric power used by an electrical appliance at any given time

Maximum Power Point or Peak Power Point – That point on an I-V curve that represents the largest area rectangle that can be drawn under the curve. Operating a Solar PV array at that voltage will produce maximum power

Module – The smallest replaceable unit in a Solar PV array. An integral, encapsulated unit containing a number of Solar PV cells. (Also Solar Modules and Solar PV modules)

N-Type Silicon – A Solar PV silicon material that has been doped with a material that has more electrons in its atomic structure than does silicon.

Panel – A number of Solar PV cells combined together in a single unit (Also Solar Panel and Solar PV Panel)

Peak Load – The maximum load demand on a Solar PV system

Photovoltaic System – An installation of Solar PV modules and other components designed to produce power from sunlight and meet the power demand for a designated load.

Polycrystalline Silicon – A material used to make Solar PV cells which are made from large blocks of molten silicon carefully cooled and solidified. (Also Multicrystalline silicon)

Semiconductor – A material that has limited capacity for conducting electricity. The silicon used to make Solar PV cells is a semiconductor

Silicon (Si) – The most common semiconductor material used in Solar PV devices

Solar Cell - A Solar PV cell (also called photovoltaic cell) is a solid state device that converts the energy of sunlight directly into electricity by the photovoltaic effect

Solar Module – The smallest non divisible unit in a Solar PV Array (Also Solar PV Panel, Photovoltaic Module)

Stand Alone System – A Solar PV system that operates independently of the utility grid

Standard Test Conditions – Conditions under which a Solar PV module is typically tested in a laboratory

String – A number of Solar PV modules or Solar PV panels interconnected electrically in series to produce the operating voltage required by the load. (Also Solar Array)

System Operating Voltage – The voltage output of a Solar PV array under load. The system operating voltage is dependent on the load of batteries connected to the output terminals

Tilt Angle – The angle of inclination of a Solar PV collector measured from the horizontal

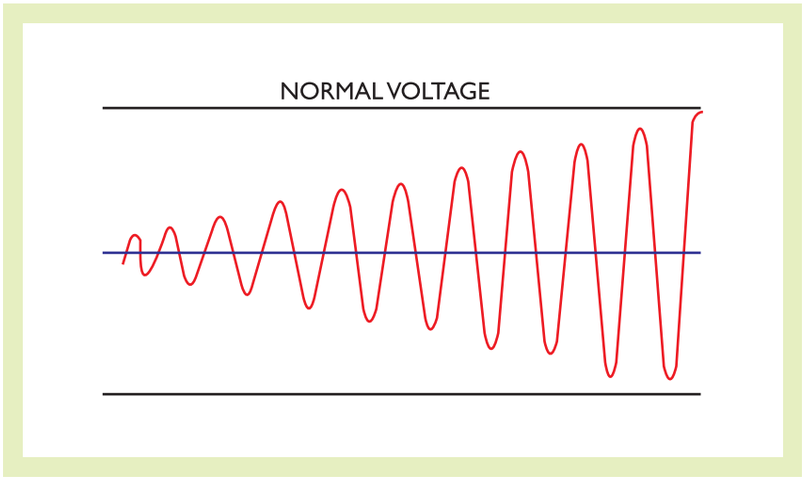
Grid Inverter – An inverter that can function only when tied to the utility grid, and uses the prevailing line-voltage frequency on the utility line as a control parameter to ensure that the PV systems output is fully synchronised with the utility power

Wafer – A thin sheet of semiconductor material produced by mechanically slicing it from a single crystal or multicrystal ingot or casting

Soft Start Technology

Su-Kam DSP Sine wave Inverter – Colossal Series incorporates Soft Start Technology, which does not allow high startup currents from large inductive loads to shut down the inverter. Soft Start improves inverter operation. Major Soft Start **features**

- Gradual voltage ramp-up during inverter startup. This eliminates failed cold starts under load.
- Output that momentarily dips in voltage and quickly recovers to allow large motorized loads to start. This eliminates almost all shutdowns from momentary overloads.



Cold Start

The Cold Start function of Su-Kam DSP Sine Wave Inverter – Colossal Series enables the user to start the inverter in Battery mode, even in the absence of power from the mains (Grid Power).

Generator Compatible

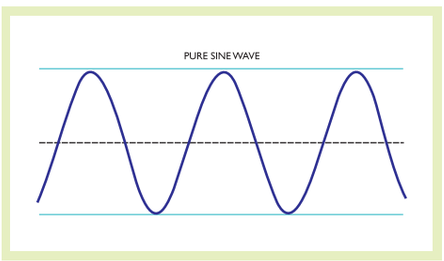
Su-Kam DSP Sine Wave Inverter – Colossal Series has a unique advantage of being compatible with your existing generator i.e. it can charge batteries from grid (Mains) power as well as power produced by generators.

Solar Compatible

Su-Kam Inverters can be integrated with solar power to charge the batteries by using external solar charge controller.

Pure Sine Wave

Pure Sine Wave power is 100% clean, regulated, completely stable and distortion free.



Advantages

Pure Sine wave power is absolutely safe for running the most sensitive and expensive equipment without the irritating, humming sound.