www.**KEYSUN**.org

Stable like the SUN
KEYSUN

» Experience and research

- 35 years of battery experience
- Continuous technical innovation
- Professional R&D team
- Sustainable & Comfortable Power Solution

» Productions and products

- superior quality products
- customized products and services
- Complete life cycle management

» Organization

- Comprehensive and effective supply chain
- Our marketing team works closely with clienys
- Complete consultation and research system with your team
- Providing high-quality battery and storage solutions and services

Certificate


CERTIFICATE

VERIFICATION OF COMPLIANCE

This Verification is Here By Issued To the Following Company:

Behin Sanaye FARAN ENERGY Co

(Faran Energy_Keysun)

Address: No. 113, Noavari 11, Pardis Technology Park, Tehran, Iran.

Scope: Design & Production: Lithium Battery Pack.

TÜV INTERNATIONAL GROUP

The Test Result of This Report Relace Only Based On Annex 5 Self Testimony, Self Certified and Technical File That Prepared By the Company

According to Directive 2006/66/EC

Registration Number: 4791248

Original Approval: 3rd Dec 2023

Certificate Expiry: 2nd Dec 2024

On behalf of TUV-INTERNATIONAL Limited


CERTIFICATE

Registration Certificate

This document certifies that the environmental management system of

Behin Sanaye FARAN ENERGY Co

(Faran Energy_Keysun)

With the following Address:

No. 113, Noavari 11, Pardis Technology Park, Tehran, Iran.

Have been assessed and approved by

TUV-INTERNATIONAL Limited

To the following standard:

ISO 14001:2015

The approved system apply to the following scope:

Design & Production: Lithium Battery Pack, BMS, Charger, Hybrid Solar Inverter

Reference Number: 4791247

Original Approval: 5th Dec 2022

Current Certificate: 5th Dec 2023

Certificate Expiry: 3rd Dec 2025

On behalf of TUV-INTERNATIONAL Limited


CERTIFICATE

Registration Certificate

This document certifies that the quality management system of

Behin Sanaye Faran Energy Co.

(Faran Energy_Keysun)

With the following Address:

No. 113, Noavari 11, Pardis Technology Park, Tehran, Iran.

Have been assessed and approved by

TUV-INTERNATIONAL Limited

To the following standard:

ISO 9001:2015

The approved system apply to the following scope:

Design & Production Lithium Battery Pack, BMS, Charger, Hybrid Solar Inverter.

Reference Number: 4791246

Original Approval: 10th Dec 2022

Current Certificate: 6th Dec 2023

Certificate Expiry: 9th Dec 2025

On Behalf of TUV-INTERNATIONAL Limited


گواهی نامه عضویت در انجمن تولید کنندگان باتری ایران


مجوز واحد فناوری


سندیکای صنعت برق ایران

Iran Electrical Industry Syndicate

گواهی عضویت

Certificate of Membership

Behin Sanaye Faran Energy Co.

with registration No: 2426

شرکت بهین صنایع فاران انرژی

به شماره ثبت: ۲۴۲۶


SATKA

گواهی عضویت

Certificate of Membership

Behin Sanaye Faran Energy Co.

with Registration No: 2426

شرکت بهین صنایع فاران انرژی

به شماره ثبت: ۲۴۲۶


IRRENA

CERTIFICATE OF MEMBERSHIP

گواهی عضویت

Date Of issue : 21 March 2023

شرکت بهین صنایع فاران انرژی

BEHIN SANAYE FARAN ENERGY

Registration No.2426 & Membership No.1402041112

is the member of IRRENA and has all the related rights and benefites of membership during the period of membership.

The validity of this certificate is until the end of year 1402.


Certificate of Membership

Company Name: BEHIN SANAYE FARAN ENERJI

- **UPS Lithium-ion Battery**
- **E Motorcycle**
- **POS Battery**
- **Medical Equipment Battery**

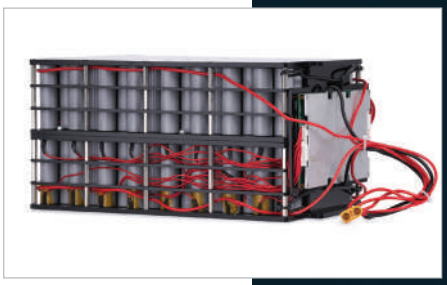
Before the invention of Lithium-ion-ion batteries in the 1970s, lead-acid batteries were predominantly used in many applications. The Lithium-ion-ion battery hashas overtaken lead-acid batteries in the market as they are even more durable. The Lithium-ion-ion battery market is expected.

Both the lead-acid and Lithium-ion-ion batteries are rechargeable and can last long. Both Lithium-ion-ion and Lead-acid batteries work on the same principle.

The primary difference lies in the material used as the cathode, anode, and the electrolyte. In a lead-acid battery, lead is used as the anode, and lead oxide is used as the cathode.

In a Lithium-ion-ion battery, carbon is used as the anode, and Lithium-ion oxide is used as the cathode. Lead-acid batteries use sulphuric acid as an electrolyte, and li-ion batteries use lithium-ion salt as an electrolyte. While discharging, ions flow from anode to cathode through the electrolyte, and the opposite reaction occurs while charging.

Battery capacity is the amount of energy stored in a battery per unit volume. It directly indicates the amount of active material within the battery. Lithium-ion batteries have a higher capacity than lead-acid batteries.



- **Lithium-ion Power Solution**
- **Save Box**
- **Solar Energy Storage**
- **ESS**

Renewable energy in residential systems is increasingly promising, the price of energy from the utility grid can reach high costs depending on some variables, e.g. availability of resources, climate, etc., especially in peak demand.

Photovoltaic (PV) and hydrokinetic (HKT) systems, when combined with energy storage, can reduce electricity costs by decreasing reliance on the grid during peak hours when energy prices are higher.

This alternative could be feasible, however, the energy sent to the grid could not meet the quality standards of the electricity distribution companies, since PV and HKT present power fluctuations. The stability of the electrical system may be compromised if there are too many users.

It is because of that, an efficient method of power smoothing from renewable sources and the load is necessary, in this way, the indexes of energy quality and stability in the power system can be improved. It is important to point out that, with the purpose of determine the efficiency of method.

Compact & Elegant Design

Slim Design for maximum space saving. Easy installation and plug and play.

Battery Specification

Items	Parameter
Charging Method	CC-CV constant current and constant voltage
Charging Voltage	57.6 V ± 50mV
Over Charging Protection	3.65 ± 20mV
Standard Charging Current	50A (0.5C)
Max. Charging Current	100 A
Cut-off Charging Current	2A (0.02C)
Standard Discharging Current	50A (0.5C)
Max. Discharging Current	100A
Discharging cut-off Voltage	43.2V
Over Charge Current	/
Level 1 Over Discharge Current	110A, protection delay 1.0S, automatically released after 1min
Level 2 Over Discharge Current	≥150A, protection delay 500ms, automatically released after 1min
Over Discharging Protect	2.7 ± 20m V(1S)
Internal Resistance	<10mΩ
Balancing voltage	3.450V ± 20mV
balancing current	65mA
Standard Charge Temperature	5~60 °C
Standard Discharge Temperature	-15~60 °C
Storage Humidity	65% RH not condensed
Storage Temperature	-20~60 °C
Size	730*165*1430mm (without handles, terminals, lugs)
Weight	About-200 kg
Storage Humidity	65% RH not condensed

Inverter Parameter

Mains Mode	
Rated input voltage	220/230 Vac
Input voltage range	(170 Vac ~280 Vac)±2% (90 Vac ~280 Vac)±2%
Frequency	50 Hz / 60 Hz (auto detection)
Frequency range	47±0.3 Hz ~ 55±0.3 Hz (50 Hz); 57±0.3 Hz~ 65±0.3 Hz (60 Hz);
Overload/short circuit protection	breaker
Efficiency	>95%
Conversion time (Bypass and Inversion)	10 ms
AC reverse protection	have
Maximum bypass overloa current	40A

Mains Charging	
Battery Type	Lead acid or lithium battery
Maximum charging current	60A
Charging current error	±5Adc

Inverter Mode	
Output voltage waveform	Pure sine wave
Rated output power (VA)	5500
Rated output power (W)	5500
Power Factor	1
Rated output voltage (Vac)	230 Vac (200/208/220/240 Vac Settable
Output voltage error	±5%
Output frequency range (Hz)	50 Hz ± 0.3 Hz /60 Hz ± 0.3 Hz
Efficiency	>90%
Overload protection	(102%<load<125%) :Call the police and Turn off the output after 5 minutes; (125%<load<150%) : Alarm and shut down output after 10 seconds; Load>15 Alarm and Turn off the output after 5 seconds;
Peak Power	11000 VA
Motor load capacity	4HP
Output short circuit protection	Breaker
Bypass circuit breaker specifications	40A
Rated battery input voltage	48V (Minimum starting voltage 44V)
Battery voltage range	40 Vdc ~60 Vdc ± 0.6 Vdc (undervoltage warning/shutdown voltage/ Overvoltage alarm/ Overvoltage Recovery... LCD Screen can be set)
Power saving mode	load≤50W

Grid

Meters

DC

AC

Solar panels

Monitoring

- Web
- App
- LCD

House Load

Diesel Generator

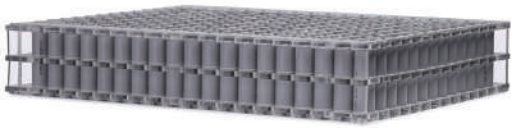
KEYSUN
All-in-one Ess

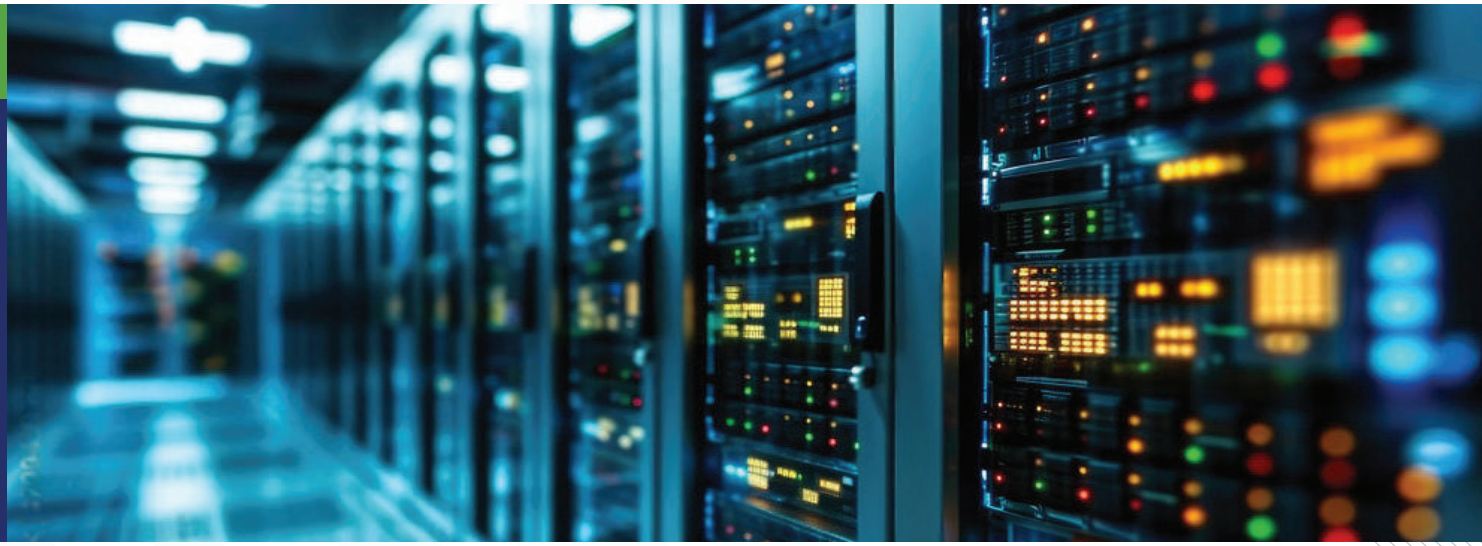
UPS battery pack

Battery pack cycle: 1000_7000

SANA ENERGY specializes in the production of lithium-ion battery packs for UPS systems, tailored to meet the specific needs of UPS manufacturers.

We are equipped to support all types of UPS solutions. This version is concise, professional, and clearly communicates the essential information.





- **Data Center**
- **Solar Energy Storage**
- **UPS**
- **Telecommunication**

SANA ENERGY offers a 48V lithium-LFP battery solution for solar energy storage, as well as for BTS telecommunications systems and servers.

Specifications

NO	Item	Specifications	Notes
1	Typical Capacity	100AH	-
2	Weight	45Kgr	-
3	Nominal Voltage	48V	-
4	Discharge Cut-Off Voltage	40/5V	-
5	Standard Charge Current	20A	$0^{o}C$~$45^{o}C$
6	Maximum Discharge Current	100A	$10^{o}C$~$60^{o}C$
7	Operating Temperature	$0^{o}C$~+$65^{o}C$	Charging
		-$20^{o}C$~+$55^{o}C$	Discharging
8	Cycle	6000cycle	-

SANA ENERGY offers a 51.2V lithium-LFP battery solution for solar energy storage, as well as for BTS telecommunications systems and servers.

Specifications

NO	Item	Specifications	Notes
1	Typical Capacity	100AH	-
2	Weight	45Kgr	-
3	Nominal Voltage	51.2V	-
4	Discharge Cut-Off Voltage	43.2V	-
5	Standard Charge Current	20A(0.2C)	$0^{o}C$~$45^{o}C$
6	Maximum Discharge Current	100A	$10^{o}C$~$60^{o}C$
7	Maximum charge Current	100A	$0^{o}C$~$55^{o}C$
8	Operating Temperature	$0^{o}C$~$+55^{o}C$	Charging
		$-10^{o}C$~$+60^{o}C$	Discharging
9	Cycle	6000cycle	-

» FE200 Portable Power Station 320Wh

Specifications

Model	FE200
Capacity	320Wh
AC Output Waveform	Pure Sine Wave
Input	DC charging: 20V-3.0A PD charging: 5V/9V/12V/20V/-3A (MAX 60W) Solar charging: 5-28V-3A (MAX60W)
OutPut	AC outpu*1t: 220-240Vac 50Hz Rated Power: 240W Peak Power: 350W DC Output*2: 2:12V-8A (Max 10A) QC3.0 Output*2: 5V-3A/9V-2A/12V-1.5A (MAX 18W) USB-C Output/Input*1: 5V/9V/12V/15V/20V-3A (MAX 60W)
LED Light	3W
Cell Type	LiFePO4
Cycle Life	Remaining Capacity above 80% after 3500+cycles
Charging Temperature	0°C-40°C
Discharge Temperature	-10°C-40°C
Storge Temperature	-10°C-40°C
Safety Protection	Temperature control, surge protection, short circuit protection, etc.
Product Size	242X204.8X88mm
Weight	4.0kg

about **7** recharges
Laptop (41.4Wh)

about **50** hours
GoPro (5.9Wh)

about **3** recharges
DJ Drone (89.2Wh)

about **5** hours
32" (60W)

about **18** hours
Switch (16Wh)

about **75** hours
Foodlight (4W)

about **7.5** hours
Mini Fridge (40W)

about **30** recharges
Smartphone (10Wh)

20 hours
CPAP without heated humidifier (15W)

» FE500 Portable Power Station 500Wh

Specifications

Model	FE500
Battery Energy	518Wh(19.2V-27Ah)
AC Output Waveform	Pure Sine Wave
Input	AC charge Input Power: 27V-4.5A Solar Charge Input: 12-29V DC (MAX 120W) USB-C*1: 20V-3A (MAX 60W)
OutPut	AC output: 220-240Vac 50Hz Rated Power: 500W Peak Power: 1000W USB-A(Output*3): 5V-2.4A USB-C(Output*1): 5V/9V/12V/15V/20V-3A(MAX 60W) Wireless charging*2: 10W
Battery Type	LiFePO4 Battery
Cycle Life	Remaining Capacity above 85% after 3500 cycles
Charging Temperature	0°C-40°C
Discharge Temperature	-10°C-40°C
Storage Temperature	-10°C-40°C
Idle Life	It is recommended to charge the product every 3 months
Product Size	287X161X230mm
Weight	7.0kg

about **12** recharges
Laptop (41.4Wh)

about **84** hours
GoPro (5.9Wh)

about **5.5** recharges
DJ Drone (89.2Wh)

about **8** hours
32" (60W)

about **31** hours
Switch (16Wh)

about**125** hours
Foodlight (4W)

about **12** hours
Mini Fridge (40W)

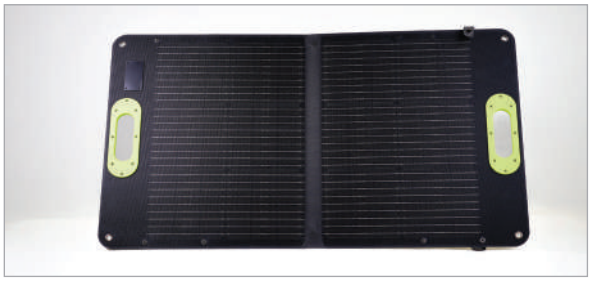
about **50** recharges
Smartphone (10Wh)

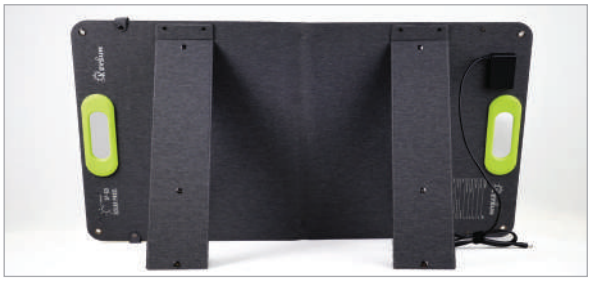
33 hours
CPAP without heated humidifier (15W)

» 60W Foldable Solar Panel

Specifications

Model	SP-60
Peak Power	60W
Cell Conversion Rate	23%
USB-A1	5V-3A (MAX)
USB-A2	5V-3A/9V-2A/12V-1.5A
USB-C	5V/9V/12V/15V/20V-3A
Unfolded Dimensions	960*550*4.0MM
Folded Dimensions	480*550*40MM
Operating Temperature	-40°C~85°C
Weight	3.3 kg

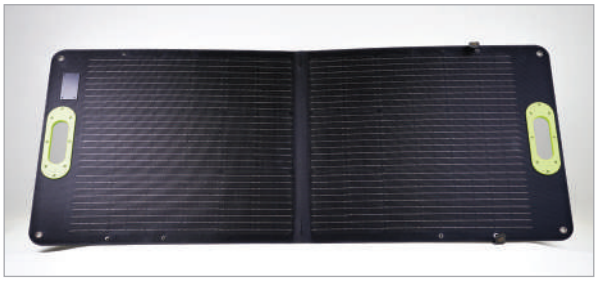




» 100W Foldable Solar Panel

Specifications

Model	SP-100
Peak Power	100W
Cell Conversion Rate	23%
USB-A 1	5V-3A (MAX)
USB-A 2	5V-3A/9V-2A/12V-1.5A
USB-C	5V/9V/12V/15V/20V-3A
Unfolded Dimensions	1280*550*4.0MM
Folded Dimensions	640*550*40MM
Operating Temperature	- 40°C ~85°C
Weight	4.5 kg

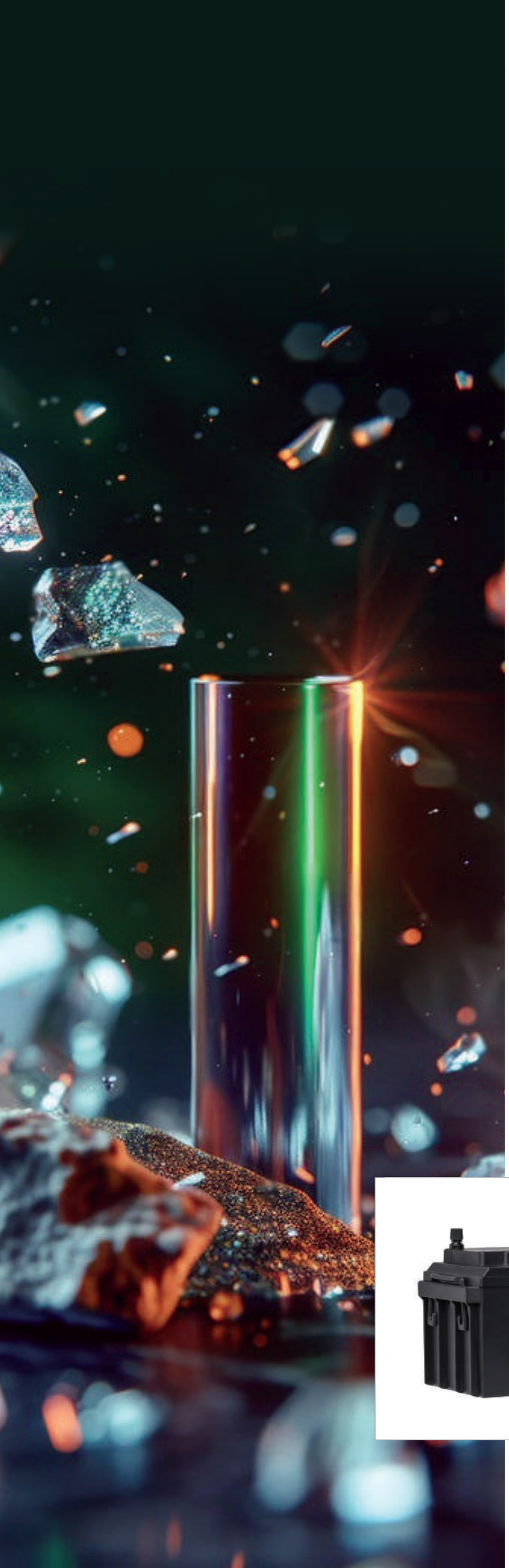


- **Smart Hybrid Inverter**
- **ESS System**
- **Power energy wall mount**
- **Power everythings**

The selection of renewable sources to synergize is still significant, but the connection of these components is equally crucial for a dependable system for avoiding technical issues that might degrade the system's performance. In our case, a solar power system with a battery storage system that will feed a single home was constructed.

Energy flow management strategy proposed for the PV solar home
During the day, solar energy prioritizes providing electricity to the loads. If the battery voltage is higher than the high SOC limit for 1 min, the algorithm will switch to battery mode, supplying power to the load from both the solar and the battery. When the battery voltage falls below the low SOC limit for 1 min, the algorithm switches to bypass mode, the utility only supplies electricity to the load, and the solar charges the battery simultaneously.

The most crucial aspect of a renewable hybrid system, is the management of size, efficiency, and reliability of power output.



- **Lithium Battery Laboratory**
- **Cell tester**
- **Pack Analyzer**
- **BMS Tester**

Lithium-ion batteries (LiBs) are widely accepted as a promising solution for various applications, owing to their high energy density, high power densities, and extended lifespan. Recent innovations aimed at increasing battery safety and energy density further elevate the LiB technology to the next level. This has resulted in the broader acceptance of Li-ion cells across various applications such as grid storage and the Electric Vehicle (EV) market.

Growth of solid electrolyte interphase layer (SEI) , loss of lithium inventory, loss of active material, increase in internal impedance and lithium plating are the most common factors that result in battery aging. In literature, battery aging has been studied using both destructive and non-destructive methods.

Cyclic aging is caused by to the stress factors the cell undergoes during charge-discharge cycling namely the internal temperature gradients (due to ohmic and/or entropic effects), charge-discharge rates, and depth of discharge (DoD) of operations [13]. Calendar degradation occurs continuously; when the batteries are in an idle state, as well as during charging and discharging.

» Charger

- **Charger Solutions**
- **EV Charger**

Whether you manage a shop, hotel, workplace, or any other commercial location, having charging ports on-site can bring your business a host of benefits.

From giving you an edge over your competition to helping you drive profit and attract loyal customers who stay longer and spend more, there has never been a better time to invest. Plus, your EV-driving employees, customers, and visitors will be appreciated for the convenient amenity, allowing them to charge up and get on with their day.

MODEL	EVDC-40kW	EVDC-80kW	EVDC-60kW	EVDC-90kW
INPUT				
Input Voltage	260~475 Vac (three-phase five-wire)			
Input Current	<60 A	<180 A	<120 A	<180 A
Frequency	40 ~ 70 Hz			
Efficiency	95%			
Power Factor	> 0.98			
Over half load Current THD	< 5%			
OUTPUT				
Outpot Voltage	200 ~ 1000 V			
Outpot Current	150 A	200 A		
Soft-Start time	3 ~ 8 s			
Regulated accuracy	+ 0.5%			
Stabilized current precision	+ 1A(0 ~ 50A), +1%(>50A)			
Noise	<65dB			
CHARGING CONFIGURATION AND STANDARD				
Number of charging plugs	1(Standard) , 2(Optional)			
Charging cable length	5m			
Charging Protocols	CCS or CHAdeMO			
Standards	IEC 62196, IEC 61851, EVS G105			
OTHERS				
Operating Temperature	-20°C ~ +50°C			
Storage temperature	-40°C ~ +80°C			
Relative humidity	< 95%			
Atmospheric pressure	70 ~106 kPa			
IP rating	IP 54			
Dimensions (W*D*H) (mm)	550*450*1800			
Packged dimensions (W*D*H) (mm)	895*555*1930			
Weight (kg)	< 150			

SANA ENERGY provides a range of solutions with safe and reliable batteries to various automotive industries.

Due to the unique technology of various electric car production factories, **SANA ENERGY**, with a group of technical experts and experienced consultants, helps the electric car industry in the field of improving the quality and efficiency of car batteries, both commercial and general vehicles.

- **Electric Commercial Vehicle**

- Contact **SANA ENERGY** to learn more about the our solutions for any industry, especially the electric vehicle industry, and how to help you meet your individual needs.

- **Electric Passenger Car**

In general, electric car batteries are made of a series of individual battery cells. Depending on the model, several hundred of these cells are connected in series to form the car battery.

Availability
- Off-the-shelf available

High peak power
- High peak power capability
- Fast charging compatibility

Customizable setup
- Connectivity up to 12 batteries via gateway up to 506 kWh
- Ideal for 400V & 800V architecture

Field proven technology
- Based on automotive BMW i3 battery
- Over 1 Bn. km driven p.a.

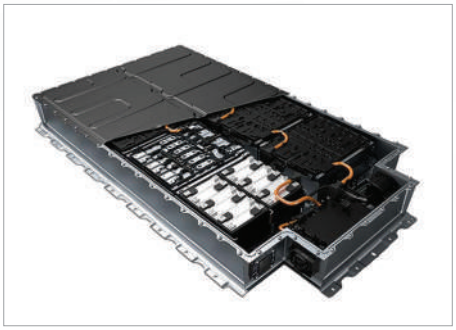
High quality components
- Samsung SDI battery cells (NMC)
- High quality electronic components
- Proven long lifetime
- Manufactured in Germany

Easy integration
- Contact protection on pack level
- Standardized interfaces & customized software

Designed for critical mobility applications
- Safety certified Battery Management Systems (BMS)
- Robust passive safety structure

Standards Compliance
- ECE R100 Battery safety
- ECE R10 EMC
- UN 38.3 Transport Safety
- ISO 16750 Environmental conditions
- Functional safety
- ISO 26262 ASIL C
- Fully compliant for a wide range of mobility applications and use cases.

Applicable Conditions
- Ordering Code: 01-1001485
- **Optimized shipping quantity:**
- Europe: 42 batteries in wooden box or 54 in returnablerig
- Overseas: 48 batteries in wooden box



Parameter	Unit	Value
Configuration(Modules x Cells)		96s1p (8 x 12)
Battery Cell Chemistry		NMC
Chargingend point(operation)	V	403.2
Nominal Voltage (DC)	V	352.3
Discharge end point (operation)	V	259.2
Nominal Capacity	Ah	120
Energy Content (nominal)	kWh	42.2
End of Life (State of Health)*	%	70
Cycle Life (@25 °C ambient, 1C/1C & 100% DoD)	#	>2,500
Cycle Life (@25 °C ambient, 1C/1C & 80% DoD)	#	>3,000
Max. Discharge Power (5s, 90 % SoC, 25 °C)	kW	148
Cont. Discharge Power (1200 s, 90 % SoC, 25 °C)	kW	53
Max. Charge Power (3s, 50% SoC, 25 °C)	kW	80
Cont. Charge Power (25 °C, until CV charging step, for one cycle, cooling required)	kW	50
Protection class (IP class)		IP67, IP6K9K
Dimensions (L x W x H) Housing	mm	1,662 x 964 x 174
Total Weight (depending on variant)	kg	approx. 276
Humidity Range(during storage)	%	0-90 (nocondensation)Heating
Heating		1kW electricalheatingincluded
Cooling		RefrigerantR1234yf; R134a

*Further use beyond this point is not recommended for safety reasons.

Since **SANA ENERGY** mission is to produce lithium-ion battery packs, managing several lithium batteries in parallel is not an easy task due to the possibility of imbalance and safety issues.
As a result, **SANA ENERGY** research and development team has prioritized the engineering, design, testing, and analysis of BMS.

- **The Critical Role of BMS in Parallel Battery Systems**

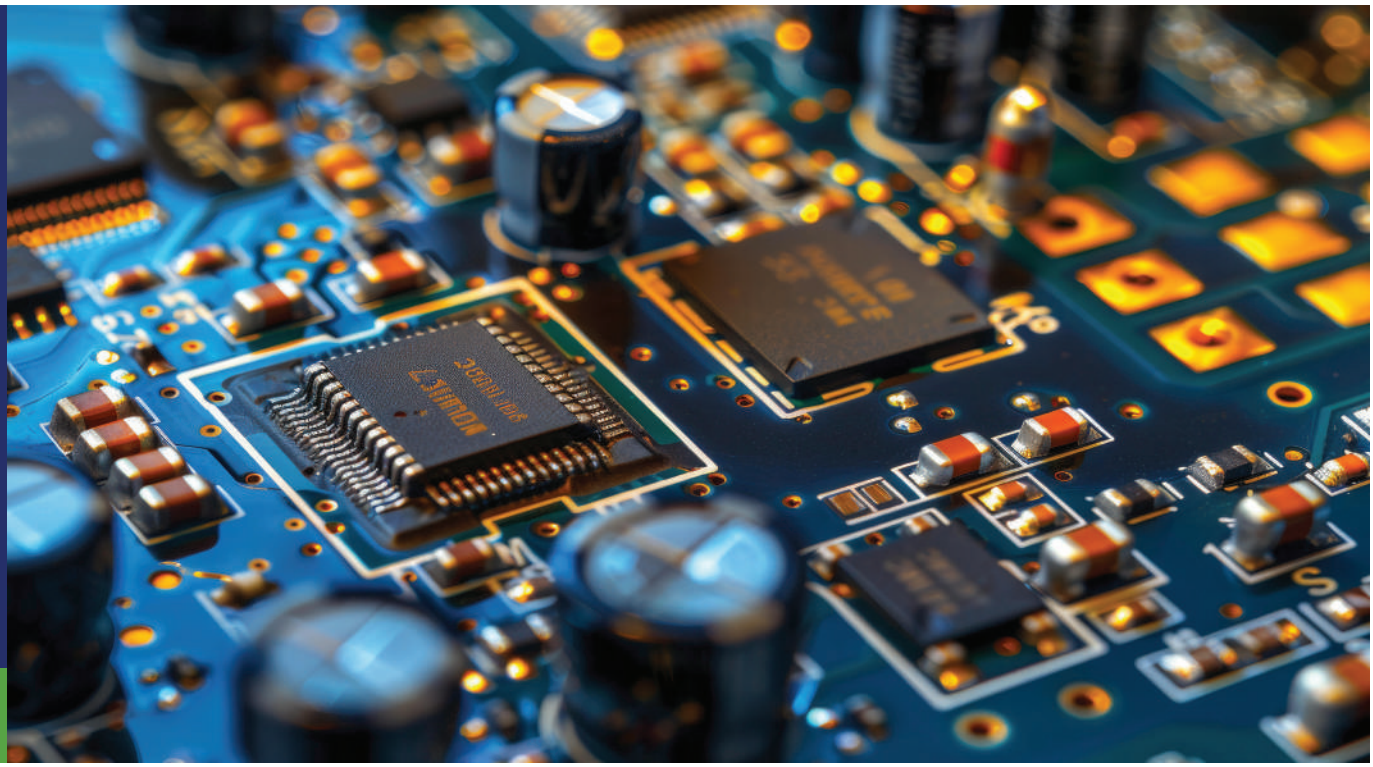
Ensuring Voltage and Current Balance: In a parallel configuration, each lithium battery pack must maintain the same voltage level to function correctly. Variations in voltage or internal resistance among packs can lead to uneven current distribution, with some packs being overworked while others underperform.

This imbalance can quickly lead to performance degradation or even failure. A BMS continuously monitors and balances the voltage of each pack, ensuring they operate harmoniously to maximize efficiency and safety.

- **Safety Management**

Safety is a paramount concern, Without a BMS, parallel packs can experience overcharging, over-discharging, or overheating, which can lead to thermal runaway—a potentially hazardous situation where a battery can catch fire or explode.

The BMS acts as a safeguard, monitoring each packs temperature, voltage, and current. It takes corrective actions such as disconnecting the charger or load if any pack exceeds safe operating limits.



- **Strengthen intelligence together**

Through years of continuous research, product refinement and market expansion, **SANA ENERGY** ulated extensive knowledge through practical experience.

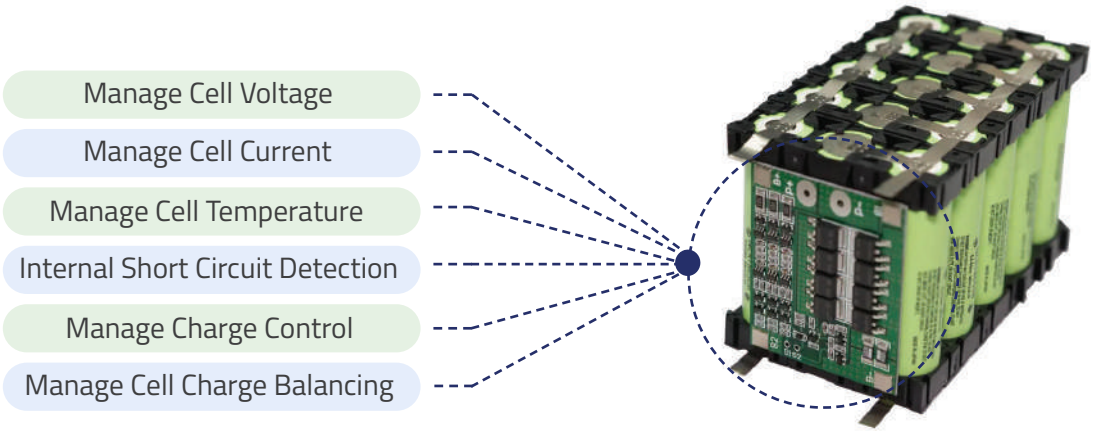
By adopting a culture of innovation and continuous improvement, we prioritize customer feedback to continually enhance product quality.

SANA ENERGY s committed to pioneering developments in the global BMS landscape and strives for greater precision, quality and competitiveness in our offerings.

Our unwavering commitment to innovation ensures a brighter future for the BMS industry, characterized by advanced technologies and unmatched quality standards.

SMART BMS

Lifepo4 Battry pack with smart | Battry Management System (BMS)



BMS

- **LifePO4 | 20S60V50A**
Discharge Current: 50A
Charge Current: 50A

- **LifePO4 | 4S12V50A**
Discharge Current: 50A
Charge Current: 50A

- **LifePO4 | 4S12V20A**
Discharge Current: 20A
Charge Current: 20A

- **LifePO4 | 4S12V10A**
Discharge Current: 10A
Charge Current: 10A

- **Li-ion | 16S60V50A**
Discharge Current: 50A
Charge Current: 50A

- **Li-ion | 8S24V30A**
Discharge Current: 30A
Charge Current: 30A

- **Li-ion | 7S24V30A**
Discharge Current: 30A
Charge Current: 30A

- **Li-ion | 4S12V30A**
Discharge Current: 30A
Charge Current: 30A

- **Li-ion | 4S12V20A**
Discharge Current: 20A
Charge Current: 20A

- **Li-ion | 4S12V10A**
Discharge Current: 10A
Charge Current: 10A

Active Balance Module

- **Li-ion | LifePO4**
Balance String: 15S
Balance Current: 1A

- **Li-ion | LifePO4**
Battery String: 7S
Balance Current: 1A

- **Li-ion | LifePO4**
Battery String: 16S
Balance Current: 1A

- **Li-ion | LifePO4**
Battery String: 8S
Balance Current: 1A

- **Li-ion | LifePO4**
Battery String: 4S
Balance Current: 1A

- **Li-ion | LifePO4**
Balance String: 3S
Balance Current: 1A

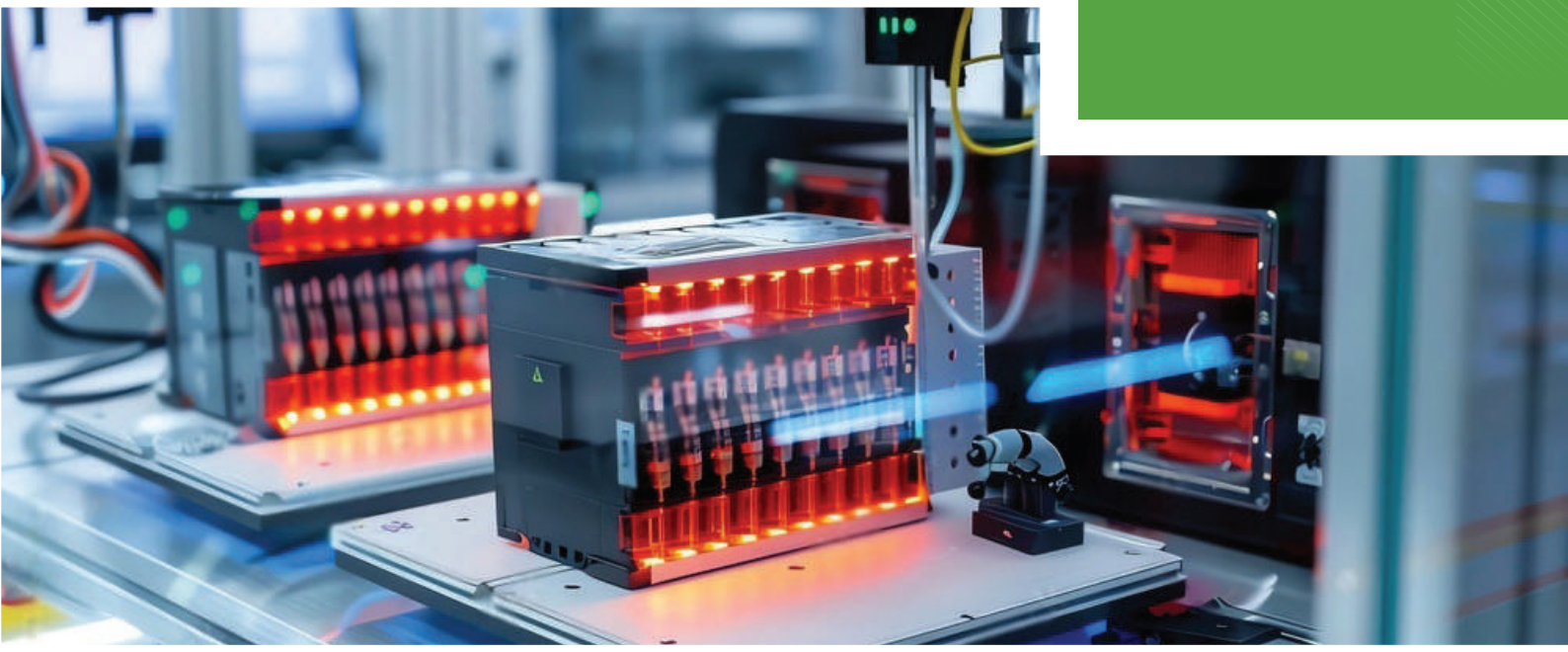
Battery Primary

34615

Battery Cell

- 18650 NCM 2600 mAh 3C
- 18650 NCM 2500 mAh 10C
- 21700 NCM 5000 mAh 3C
- 32700 LFP 6000 mAh 2C

SUSTAINABLE & POWER SOLUTIONS



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