electrical
We know Solar

SUNGROW
www.sungrowpower.com

Residential Energy Storage System

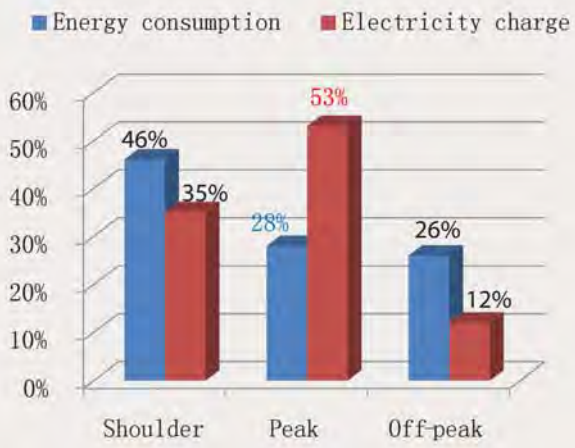
SH5K PV ESS

Green and Effective

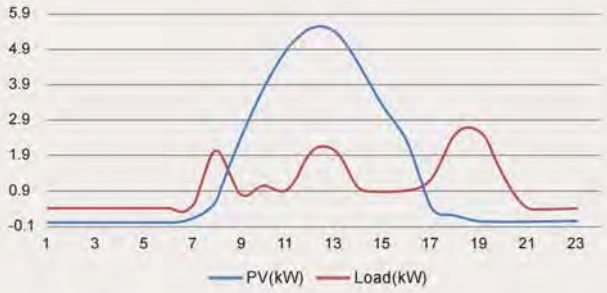
Why You Need the PV ESS (Energy Storage System)?

In many countries, with the rising popularity of solar energy and its essential PV systems, the feed-in tariffs of PV power have dropped considerably. Nevertheless, the average electricity prices are still growing at a rapid rate, resulting in increasing burdens on the households.

Electricity used in peak times can place a strain on the grid network, that is why energy providers charge a relatively larger amount for its service at peak time. As such the peak time service fee tends to be higher than the cost of actual usage.



The average power consumption of a typical household for instance, 28% of its usage during peak period would contribute to 53% of the total electricity bill.



In the above scenario, families are much better off financially by installing a PV power generation system. But as shown in the figure, the consumption period of household loads does not match the output period of PV power generation well.

The problems at hand:

For our customers to store the PV generated electricity when it's abundant, then utilise the stored power during the peak electricity tariff.

The SH5K PV ESS

from SUNGROW is the perfect system that will significantly increase the self-consumption of PV power. On the other hand, the utility grid will be more stable and reliable with less PV power feeding in. In addition, the SH5K hybrid inverter can also be utilised as a part of the "zero-export" system and power distribution network storage system.

Green and Effective

Great Financial Benefits Brought by SH5K PV ESS

Saves up to 70%
Electricity Bills

For average households, they would save 70% of the electricity bills every day with a SH5K PV ESS installed and reasonable configured!
And for some states, the electricity bills are calculated via single rate tariff, the SH5K PV ESS can drastically reduce the electricity spending for average households, by simply configuring the discharge interval of the battery.

Appliances Control Intelligent
With DO function

SH5K hybrid inverter also provides one Digital Output node, which can intelligently control the household appliances (such as water heaters, pumps etc..) with a simple external device. The control modes are:
* Timed control;
* Real-time control through APPs;
* Intelligent and optimal control via the inverter.

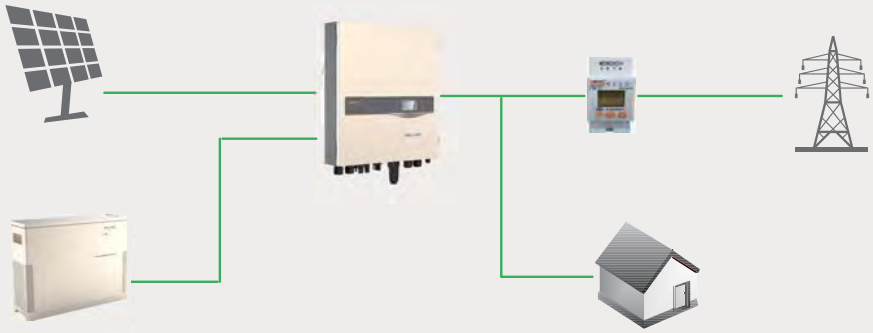
SH5K hybrid inverter has integrated the intelligent EMS (Energy Management System)!

Economic Benefits Maximized
Battery discharge-time adjustments

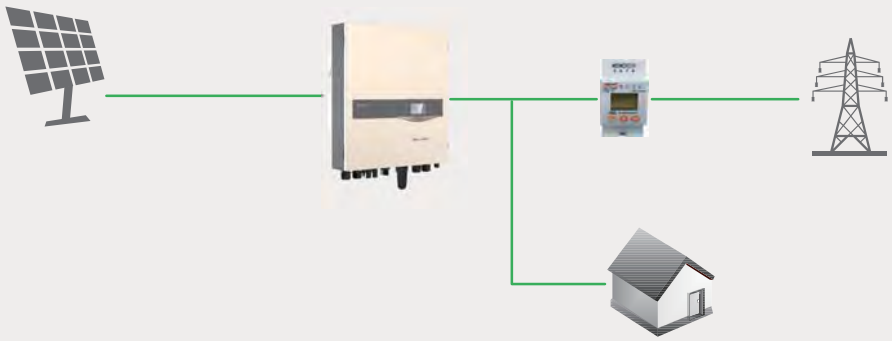
SH5K PV ESS can be configured to discharge battery at customers' convenience to better accommodate to electricity companies' different pricing rates.
Example: The peak time electricity rate in New South Wales is from 2:00 pm to 8:00 pm every weekday, it is therefore recommended to set the battery discharge time to 2 pm-8 pm on weekdays. And resort to grid electric at off-peak rate.

SH5K PV ESS Applications

Residential PV energy storage system:



"Zero-export" System

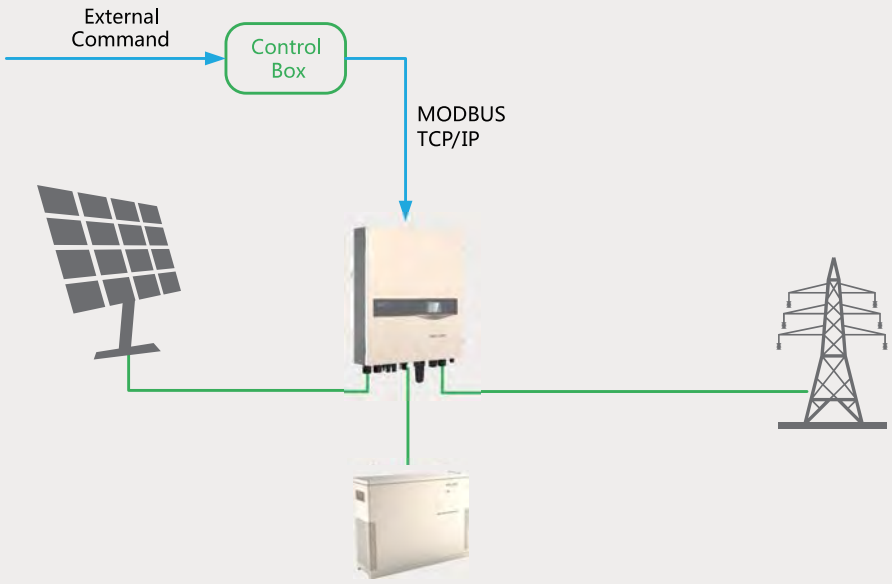


If the household loads and the PV generation curve are well matched, battery module may not be required, the SH5K hybrid inverter and meter could be used as a "Zero-export" system.

In this system, the inverter output will be derated to ensure the feed-in power be zero when a feed-in power above zero is detected by the meter.

The feed-in power threshold can be set ranging from 0 to 5000 W. If the threshold value is set to 5000 W, all excessive power will be exported.

SH5K Controllable Feature Description



With the MODBUS TCP/IP protocol, the SH5K hybrid inverter can be manually configured via Control Box to shutdown, startup, active power derating, reactive power regulation, or charge/discharge power control etc..

If the external command is from the utility grid, the system can cooperate with the utility grid to follow the power management.

If the Control Box has been connected with the ammeter of buildings, the peak load shifting function of building electricity will be activated. In such a case, the battery capacity needs to be configured according to the specific situations.

Flexible

- Handy and light, easy to handle without lift machinery assistance, lower the cost of installation and maintenance.
- EMS Integrated, multiple-target can be optimized
- Integrated DC combine and surge protection function, lower the system cost
- DC switch, safe and convenient for maintenance
- Dual MPPTs

Safe and long lifetime

- Compatible to all batteries.
- Charging/discharging lifetime could up to 6000 cycles

Grid-friendly

- Active power continuously adjustable (0~100%)
- Reactive power control with power factor 0.8 lagging~0.8 leading

Efficient

- Max. Efficiency at 98.0%
- Battery to grid efficiency at 95.0%

Qualified

- TÜV, AS4777, VDE AR N 4105

SH5K

Input Side Data

Max. PV input voltage	600V
Startup voltage	125V
Nominal input voltage	345V
MPP voltage range	125~560V
MPP voltage range for nominal power	255~520V
No. of MPPTs	2
Max. number of PV strings per MPPT	1
Max. PV input current	20A (10A/10A)
Max. current for input connector	12A

Output Side Data

Nominal AC output power	5000W
Max AC output power (PF=1)	5000W
Max. AC output apparent power	5000VA
Max. AC output current	21.7A
Nominal AC voltage	230Vac
AC voltage range	180~276Vac
Nominal grid frequency	50Hz
Grid frequency range	45-55Hz
THD	<3% (Nominal power)
DC current injection	<0.5%In
Power factor	>0.99@default value at nominal power, (adj. 0.8 lagging ~0.8 leading)

Protection

Anti-islanding protection	Yes
AC short circuit protection	Yes
Leakage current protection	Yes
DC switch (solar)	Yes

Battery Side Data

Battery type	Li-battery/ Lead acid battery
Battery voltage	48V (32V-70V)
Max charge/discharge current	65A/65A

System Data

Max. efficiency	98.0%
Max. European efficiency	97.6%
Battery to grid efficiency	95.0%
Isolation method (solar)	Transformerless
Isolation method (battery)	HF
Ingress protection rating	IP65
Night power consumption	<1W
Noise emission	<30dB
Operating ambient temperature range	-25~60℃
Allowable relative humidity range	0~100%
Cooling method	Nature convection
Max. operating altitude	4000m (<2000m derating)
Display	Graphic LCD
Communication	2×RS485/Ethernet/CAN/Wi-Fi (optional)
Power management	4×Digital Inputs, 1×Digital Output
Analogue inputs	PT1000 (temperature sensor)
DC connection type	MC4
AC connection type	Clamping yoke connector
Certificates and approvals (Planned)	AS4777, AS/NZS3100, SI4777, G59/2, G83/2, IEC62109-1, IEC62109-2, VDE-AR-N-4105, IEC 62619, IEC 61427, IEC 62040

Mechanical Data

Dimensions (W×H×D)	447×510×150mm
Mounting method	Wall bracket
Weight	20kg


Green and Effective

SUNGROW

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MC electrical
We know Solar

CanadianSolar

QUARTECH
CS6K- 270 | 275 M

Canadian Solar's new Quartech modules have significantly raised the standard of module efficiency in the solar industry. They introduced innovative four busbar cell technology, which demonstrates higher power output and higher system reliability. Worldwide, our customers have embraced this next generation of modules for their excellent performance, superior reliability and enhanced value.

*Black frame product can be provided upon request.

NEW TECHNOLOGY

- Reduces cell series resistance
- Reduces stress between cell interconnectors
- Improves module conversion efficiency
- Improves product reliability

25 years — insurance-backed warranty
non-cancelable, immediate warranty insurance
linear power output warranty

10 years — product warranty on materials and workmanship

KEY FEATURES

Higher energy yield
- Outstanding performance at low irradiance
- Maximum energy yield at low NOCT
- Improved energy production through reduced cell series resistance

Increased system reliability
- Long-term system reliability with IP67 junction box
- Enhanced system reliability in extreme temperature environment with special cell level stress release technology

Extra value to customers
- Positive power tolerance up to 5 W
- Stronger 40 mm robust frame to hold snow load up to 5400 Pa and wind load up to 2400 Pa
- Anti-glare project evaluation
- Salt mist, and ammonia resistance, apply to seaside, and farm environments

MANAGEMENT SYSTEM CERTIFICATES *

ISO 9001:2008 / Quality management system
ISO/TS 16949:2009 / The automotive industry quality management system
ISO 14001:2004 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730: VDE / CE / MCS / CEC AU
UL 1703 / IEC 61215 performance: CEC listed (US)
UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE / PV CYCLE (EU)

* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. As a leading manufacturer of solar modules and PV project developer with about 10 GW of premium quality modules deployed around the world since 2001, Canadian Solar Inc. (NASDAQ: CSIQ) is one of the most bankable solar companies worldwide.

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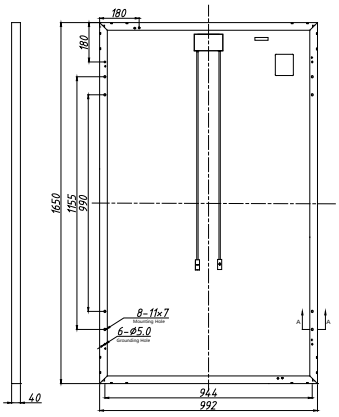
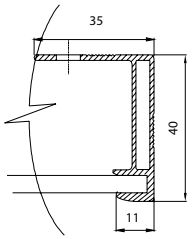
MODULE / ENGINEERING DRAWING (mm)

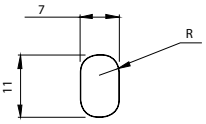
Rear View



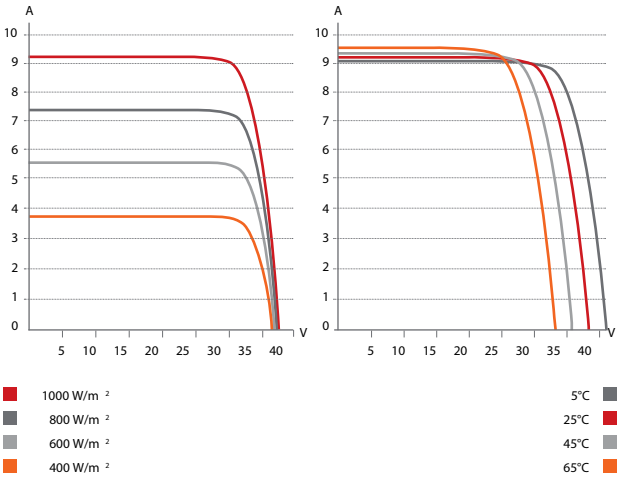
Frame Cross Section A-A



Mounting Hole



CS6K-270M / I-V CURVES



ELECTRICAL DATA / STC*

Electrical Data CS6K	270M	275M
Nominal Max. Power (Pmax)	270 W	275 W
Opt. Operating Voltage (Vmp)	31.1 V	31.3 V
Opt. Operating Current (Imp)	8.67 A	8.80 A
Open Circuit Voltage (Voc)	38.2 V	38.3 V
Short Circuit Current (Isc)	9.19 A	9.31 A
Module Efficiency	16.50%	16.80%
Operating Temperature	-40°C ~ +85°C	
Max. System Voltage	1000 V (IEC) or 1000 V (UL)	
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)	
Max. Series Fuse Rating	15 A	
Application Classification	Class A	
Power Tolerance	0 ~ + 5 W	

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA / NOCT*

Electrical Data CS6K	270M	275M
Nominal Max. Power (Pmax)	195 W	199 W
Opt. Operating Voltage (Vmp)	28.4 V	28.5 V
Opt. Operating Current (Imp)	6.87 A	6.95 A
Open Circuit Voltage (Voc)	35.0 V	35.1 V
Short Circuit Current (Isc)	7.44 A	7.54 A

* Under Nominal Operating Cell Temperature (NOCT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

PERFORMANCE AT LOW IRRADIANCE

Industry leading performance at low irradiation, average 96.5% relative efficiency from an irradiance of 1000 W/m² to 200 W/m² (AM 1.5, 25°C).

The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, Canadian Solar Inc. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.
Caution: For professional use only. The installation and handling of PV modules requires professional skills and should only be performed by qualified professionals. Please read the safety and installation instructions before using the modules.

MODULE / MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline, 6 inch
Cell Arrangement	60 (6 ˜ 10)
Dimensions	1650 ˜ 992 ˜ 40 mm (65.0˜ 39.1 ˜ 1.57 in)
Weight	18.2 kg (40.1 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	Anodized aluminium alloy
J-Box	IP67, 3 diodes
Cable	4 mm² (IEC) or 4 mm² & 12 AWG 1000 V (UL) , 1000 mm (39.4 in)
Connectors	Friends PV2a (IEC), Friends PV2b (IEC / UL)
Standard Packaging (quantity & weight per pallet)	26 pieces, 520 kg (1146.4 lbs)
Module Pieces per Container	728 pieces (40' HQ)

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.41% / °C
Temperature Coefficient (Voc)	-0.31% / °C
Temperature Coefficient (Isc)	0.053% / °C
Nominal Operating Cell Temperature	45±2°C

PARTNER SECTION