

# 光伏并网逆变器、控制器介绍

## 企业简介 introduce

HeFei Sunlight Power Supply (SPS) Co., Ltd is a high-tech enterprise famous in new energy power generation and other power supply R&D and manufacture; engaged in new energy R&D and manufacture many years, has a mature and high level R&D group, all the products has self-governed knowledge property right. Locate in leading level in china new energy industry.

合肥阳光电源有限公司是中国著名的一家新能源发电设备及其它电源产品研发、生产的高新技术企业；从事新能源研发生产多年，有着一支成熟、高水平的研发队伍，所有产品都具有独立的知识产权。在中国的新能源行业处于领先水平。

The “ solar/wind power generation control convert system ” acquired science and technology advancement one grade prize; national tackle key problems item of 15 “ industrialization of PV grid connected series inverter ” has passed nation certification ahead of schedule; awarded qualified supplier by the world bank/global environment fund; slather in “ China sunshine project ” and “ Send electricity to village project ”; it’s primary supplier of national significant power supply project.

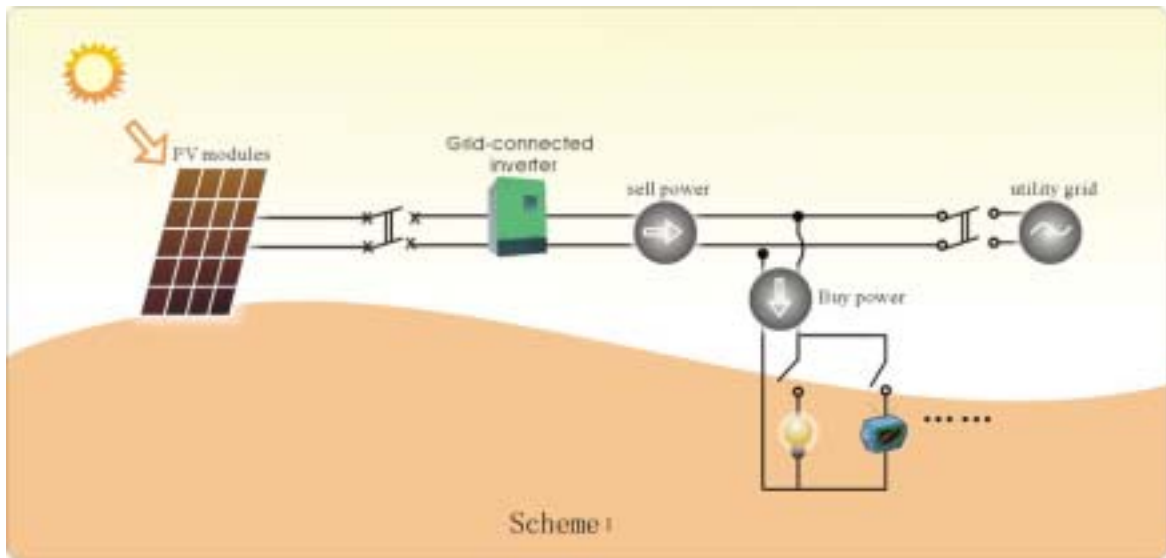
公司研发的“光伏/风能发电控制逆变系统”荣获2003年度安徽省科技进步一等奖；承担的“十五”国家科技计划攻关项目“并网光伏发电用系列逆变器产业化”已提前通过国家验收；生产的光伏充放电控制器、逆变电源被世界银行/全球环境基金 GEF 项目选为合格产品。在国家光明工程和送电到村工程中大量使用。是国家重点工程电源产品的主要供应商之一。

公司凭借可靠的质量、适用的功能、出众的性能、良好的服务从国内外众多品牌中脱颖而出；产品行销全国各地及澳门、台湾、香港等地；并已成功进入全球电源市场，远销德国、英国、日本、韩国、朝鲜等国家，很好的对国外客户提供了优质的个性化产品和良好的技术服务，得到用户的广泛认可。

## 并网逆变器 PV grid-connected inverter

PV grid-connected power system includes PV modules , grid-connected inverter, meter and power switchboard. The PV modules convert the solar energy to the DC power Then the grid-connected inverter convert the DC power to the sine wave

AC power which has the same frequency and phase with the grid voltage. The AC power feed-in the grid partly and the other power supply the local loads.



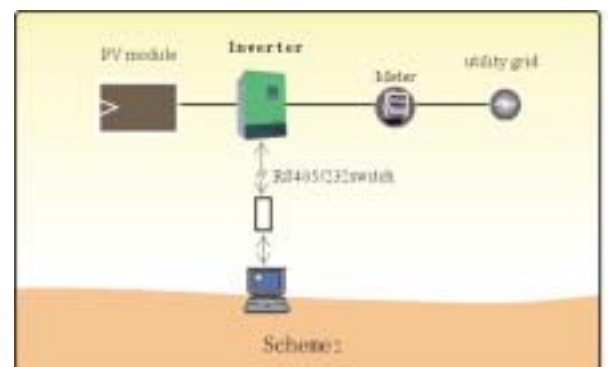
## 产品特点 Product Advantages

- Using 32bit DSP from TI company as the controller ;
- Using the fifth generation IPM from Mitsubishi company as the power components.
- PPT (Maximum Power Point Tracking) technology.
- Max Efficiency 95%.
- Zero power concept at night.
- Perfect protect functions include anti-islanding.
- Multi selection: Low frequency transformer isolation type, transformer less type , wide DC input range type.
- Self consumption at night 0W
- Utility monitoring in accordance with UL 1741,IEEE929-2000
- EMC: EN50081,part1 EN50082,part1
- Grid interference: EN61000-3-2
- Grid monitoring : DIN VDE 126

## 系统集成方案 System composing schemes

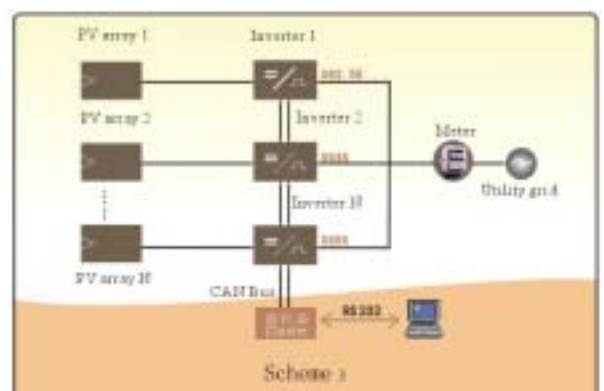
### A. Single grid-connected mode (Scheme 2)

The most suitable for use in that way in villa or family, power at 1kw to 5kw or so, combining can pass the communication of RS485 connects with the personal computer.



### B. Multi strings and multi inverters mode (Scheme 3)

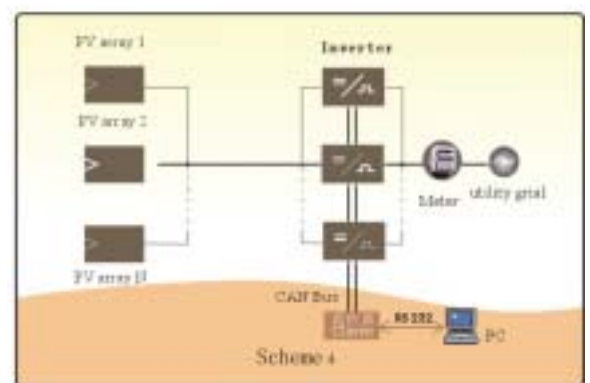
This way suits to apply to tilt to one side in the different PV array, or have the sub PV array of various model numbers, different DC bus voltage.



### C. DC bus paralleling and multi inverters mode (Scheme 4)

This operation mode is suited to apply in big power PV system, request PV array is installed in same inclination, and request the each array have the same power to merge with the module string of the DC voltage. In these parallel system, there is a central control unit. In the morning with the sunlight becoming from weak to strong, the control unit random select one inverter to run. When the output of the first inverter is near the nominal power of this inverter, the control unit starts second inverter and controls the grid-connected current of the two inverter to be same. This controlling process is going on with the sunlight becoming strong. At sunset, the control unit will stop the inverters in the same way. There are many advantages in this system composing scheme and operation mode. First of them is the customer can use the solar energy of morning and dusk mostly. The second is the "sit the Chuang by turn" operation mode can prolonged the inverters life greatly.

- ✧ When the some set in inside in network SG grid-connected inverter appears the breakdown, a redundancy for controlling machine making its with handing over direct current mother line breaking opening, realizing whole system circulates. From but increase the movement dependable of the system consumedly.
- ✧ An all movements for controlling machine can passing total line in CAN obtaining each inverter changing machine parameter, break down the appearance with generate electricity the parameter, pass the RS232 gross the on- line passing control the PC;
- ✧ The control PC can pass a cluster of SG inverters that control the machine to change to network according to the demand the machine proceeding or stop to set up the etc. operation with the parameter.



### 群控器 Cluster

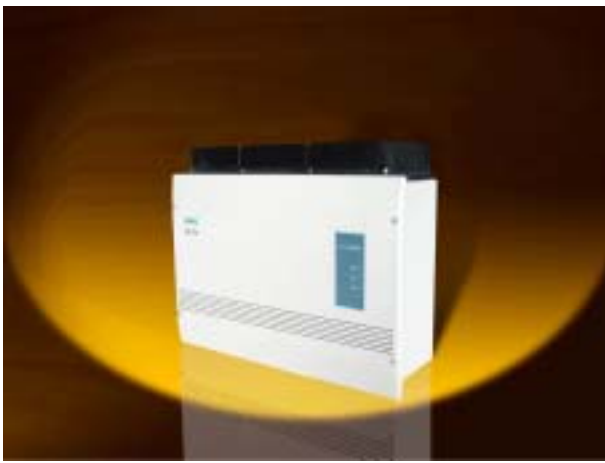
The cluster control the machine to provide the friendly man-machine interface at the same time. The customer can pass directly the LCD of LCD holds to realizes with the key the movement parameter inspect, generates electricity the deal searches, break down the search, parameter set up to wait the function.





**TYPE** **SG2.5KTL**

Isolated mode between the grid	No transformer	Maximum AC output power (W)	2500
Nominal Power (KVA)	2.5	Operating range utility voltage 单相 ( VAC )	180~260
Recommended max. generator power (Wp)	2000~3000	Operating range utility frequency (Hz)	49.5~50.5
Max. DC power (W)	2700	Power Factor	>0.98
Max. open circuit voltage (V)	450	Communication Interfaces	RS485 or CAN
MPPT range (V)	70V - 450	Operation Surroundings Temperature	- 25 ~ + 60
Max. Efficiency	95 %	Operation Surroundings Humidity	0 ~ 100%
Europe Efficiency	94 %	Size (w x h x d) mm	490 x 170 x 385
MPPT efficiency	99%	Weight (kg)	18.5
Max. input current	15	Waterproof and Dustproof Class	IP65
Nominal AC output power (W)	2200		



**TYPE** **SG3K**

Isolated mode between the grid	yes	Max. DC power (W)	450
Nominal Power (KVA)	3	Max. open circuit voltage (V)	200~450
Recommended max. generator power (Wp)	3240	MPPT range	120V - 750 V

Max. Efficiency	94 %
Europe Efficiency	92 %
MPPT efficiency	99%
Max. input current	18
Voltage ripple	VPP < 10 %
Nominal AC output power (W)	2640
Maximum AC output power (W)	5000
Operating range utility voltage ( VAC )	180~260

Operating range utility frequency (Hz)	49.5~50.5
Power Factor	>0.98
Communication Interfaces	RS485 or CAN
Operation Surroundings Temperature	- 25 ~ + 60
Operation Surroundings Humidity	0 ~ 100%
Size (w x h x d) mm	490 x 170 x 385
Weight (kg)	44
Waterproof and Dustproof Class	Ip65



**TYPE SG5KTLW**

Nominal Power (KVA)	5	Maximum AC output power (W)	5000
Isolated mode between the grid	No transformer	Operating range utility voltage 单相 ( VAC )	180~260
Recommended max. generator power (Wp)	4000~6000	Operating range utility frequency (Hz)	49.5~50.5
Max. DC power (W)	5400	Power Factor	>0.98
Max. open circuit voltage (V)	750	Communication Interfaces	RS485 or CAN
MPPT range	120V - 750 V	Operation Surroundings Temperature	- 25 ~ + 60
Max. Efficiency	96 %	Operation Surroundings Humidity	0 ~ 95%
Europe Efficiency	95 %	Waterproof and Dustproof Class	IP42
MPPT efficiency	99%	Size (w x h x d) mm	490 x 170 x 385
Max. input current	30	Weight (kg)	28
Nominal AC output power (W)	4400		



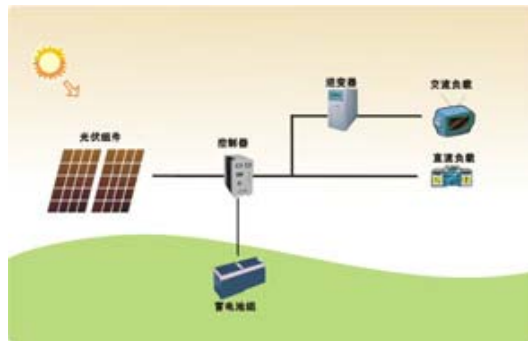
**TYPE**

**SG5 K**

Nominal Power (KVA)	5	Maximum AC output power (W)	5000
Isolated mode between the grid	yes	Operating range utility voltage ( VAC )	180~260
Recommended max. generator power (Wp)	400~6000	Operating range utility frequency (Hz)	49.8~50.2
Max. DC power (W)	5400	Total Harmonic Distortion (THD)	THD< 4 %
Max. open circuit voltage (V)	450	Power Factor	>0.98
MPPT range(V)	200 - 450	Communication Interfaces	RS485/ CAN Bus
Max. Efficiency	94 %	Operation Surroundings Temperature	- 25 ~ + 60
Europe Efficiency	92 %	Operation Surroundings Humidity	0 ~ 100%
MPPT efficiency	99%	Waterproof and Dustproof Class	IP42
Max. input current(A)	30	Size (w x h x d) mm	650 x 340 x 540
Voltage ripple	VPP < 10 %	Weight (kg)	57
Nominal AC output power (W)	4400		

# 光伏发电控制器PV controller

太阳能发电是通过太阳能板的光电效应将太阳能转化为直流电能并贮存，广泛应用于通信、微波、光缆传输、铁路通信、公路信号、照明、景观、移动用电装置等。因其环保无污染的特点，越来越成为人们关注的能源。太阳能电站的基本原理如图示：



光伏控制器是光伏发电系统中非常重要的组件。光伏控制器的性能将直接影响系统的寿命，特别是蓄电池组的使用寿命。在任何情况下，对蓄电池的过充电或过放电都会对蓄电池的使用寿命缩短。本公司具有多年生产光伏控制器的设计经验和大量的用户，产品质量稳定、可靠性高，可适应各种恶劣场所。多样化的设计外观和功能设计，可与你的系统无缝连接，组成灵活多变的系统，满足个性化的需求。

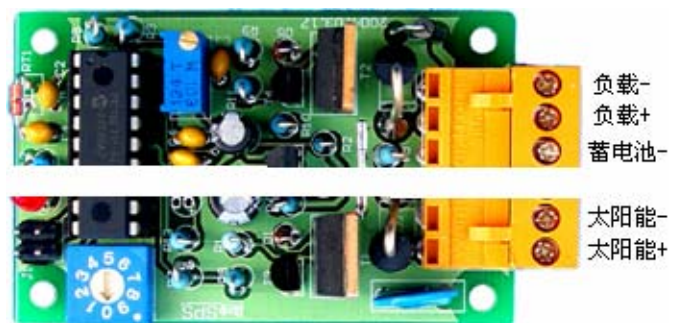
## 1. ST12/24 小型太阳能路灯充电控制器

### Small scale solar lamp charge Controller ST12/24

ST1203、ST2403、ST1208、ST2408 太阳能路灯控制器为蓄电池提供多种保护，使蓄电池更可靠的长久工作。主要为夜间照明控制使用。

#### 特点：

- 外形小巧，可内置灯具中
- 蓄电池过充电：充电电压高于保护电压时，自动关闭对蓄电池充电
- 太阳能电池接反保护：太阳能电池" + " - "极性接反，纠正后可继续使用
- 过放电保护：当蓄电池电压低于保护电压时，控制器自动关闭输出以保护蓄电池不受损坏
- 蓄电池开路保护：万一蓄电池开路，若在太阳能电池正常充电时，控制器将限制负载两端电压，以保证负载不被损伤
- 负载过电压保护：当电压过高时，自动关闭输出，保护电器不受损坏
- 夜间防反充电保护若在夜间或太阳能电池不充电时，控制器由于自身得不到电力，不会有任何动作
- 太阳能电池接反保护
- 延时动作：过充、过放、过压保护均延时动作，防止误动作
- 三阶段充电：均充、浮充自动转换，使蓄电池始终处于充满状态，电力最大限度利用。
- 温度补偿：过充保护恢复点电压和浮充电压均有温度补偿
- 光控、光控输出，实现自动控制功能。



**技术指标：**

型号		ST1203	ST2403	ST1208	ST2408
额定电压		12	24	12	24
电流	放电	3A	3A	8A	8A
	充电	3A	3A	8A	8A
充电	保护	14.4 V ± 0.1 V	28.8 V ± 0.2 V	14.4 V ± 0.1 V	28.8 V ± 0.2 V
	浮充	13.25 V~13.6 V	26.5 V~27.2 V	13.25 V~13.6 V	26.5 V~27.2 V
	恢复	13.0 V ± 0.1 V	26 V ± 0.2 V	13.0 V ± 0.1 V	26 V ± 0.2 V
	补偿	-13.2mV/	-26.4 mV/	-13.2mV/	-26.4 mV/
过放	断开	10.8 V ± 0.1 V	21.6 V ± 0.2 V	10.8 V ± 0.1 V	21.6 V ± 0.2 V
	恢复	12.3 V ± 0.1 V	24.6 V ± 0.2 V	12.3 V ± 0.1 V	24.6 V ± 0.2 V
过压	切断	16.5 V	33.0 V	16.5 V	33.0 V
	恢复	15.0 V	30.0 V	15.0 V	30.0 V
空载		<7 mA	<9 mA	<7 mA	<9 mA
环境温度		- 20 ~ + 50			
使用海拔		5500 M			
开路电压		25 V	50 V	25 V	50 V
电压降落	太阳能电池与蓄电池之间	0.4 V	0.6 V	0.4 V	0.6 V
	蓄电池与负载间	0.23 V	0.23 V	0.23 V	0.23 V

**2 SD1208、SD2408 型太阳能电源控制器**  
**Solar power controller SD1208、SD2408**

太阳能电源利用太阳能电池将太阳能转化为电能并贮存，可为牧区、边防、海岛提供照明，也可作为移动通信基站、微波站等的直流电源，也可为边远地区程控交换机等提供交流电力。

SD 型太阳能电源控制器采用微电脑芯片和无触点控制技术，并具备各种保护功能。过充保护后自动进入对蓄电池的浮充状态。



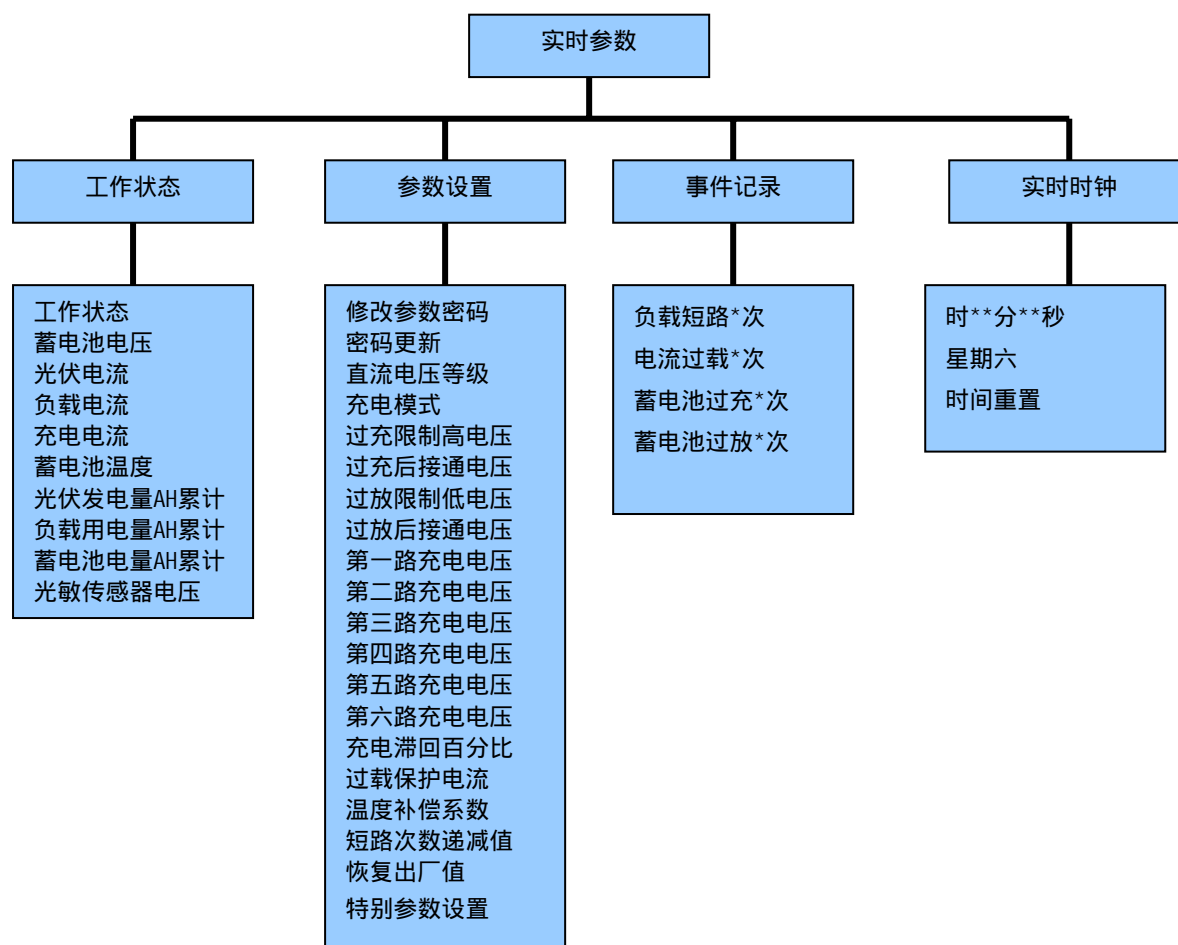
**技术指标：**

型 号		SD1208	SD2408
额定电压 (VDC)		12	24
额定电流 (A)		8	8
允许太阳能充电最大电流(A)		12	12
允许太阳能最大开路电压(V)		25	50
过充 (V)	保 护	14.4 ± 0.1	28.8 ± 0.2
	浮 充	13.5~14	27~28
	恢 复	13.6 ± 0.1	27.2 ± 0.2
过放 (V)	断 开	10.8 ± 0.1	21.6 ± 0.2
	恢 复	12.3 ± 0.1	24.6 ± 0.2
负载过压(V)	切 断	16.5	33.0
	恢 复	15.0	30.0





## 液晶显示菜单内容



## 4. SD4830 智能型控制器

Intelligent controller SD4830

### 性能特点

- 流行外观设计，功率密度大
- 蓄电池过充电保护：充电电压高于保护电压时，自动关断对蓄电池充电
- 太阳能电池接反保护：太阳能电池"+" "-"极性接反，纠正后可继续使用
- 过放电保护：当蓄电池电压低于保护电压时，控制器自动关闭输出以保护蓄电池不受损坏
- 蓄电池开路保护：万一蓄电池开路，若在太阳能电池正常充电时，控制器将限制负载两端电压，以保证负载不被损伤
- 负载过电压保护：当电压过高时，自动关闭输出，保护电器不受损坏
- 夜间防反充电保护：若在夜间或太阳能电池不充电时，控制器由于自身得不到电力，不会有任何动作
- 太阳能电池接反保护
- 延时动作：过充、过放、过压保护均延时动作，防止误动作
- 三阶段充电：均充、浮充自动转换，使蓄电池始终处于充满状态，电力最大限度利用。
- 温度补偿：过充保护恢复点电压和浮充电压均有温度补偿，外置温度传感器。



## 技术指标

<b>型号</b>		SD4830
直流额定电压 (V)		48V
额定负载电流 (A)		30A
最大光伏电池功率 KW <sub>p</sub>		1.44KW
太阳能电池组数		3
每路太阳能电池电流 (A)		10A
控制器自身耗电		0.1A
电压 降落	太阳能电池与蓄电池之间	0.6V
	蓄电池与负载之间	0.1V
保护功能		夜间防反充电保护、蓄电池过充电、输出短路保护、太阳能电池接反保护、过放电保护；蓄电池开路保护、负载过电压保护、输出过载保护；

## 5. SD24V/12V/30A 太阳能充电控制器 Solar charge controller SD24V/12V/30A

SD1230/2430 型控制器主要由蓄电池充电控制部分、蓄电池对负载放电控制部分、彩色 LED 和(或)LCD 显示等三部分组成。

### 性能特点

1. 过充电保护、过放电保护、电压过高保护
2. 电流过载保护
3. 温度补偿
4. 2 行 LCD 显示，可显示电池电压；充放电电流及控制系统的工作状态
5. 夜间功能
6. 三个按键可设定
  - A. 负载自动控制或手动开/关控制
  - B. 夜间功能
  - C. 可设定夜间定时时间
7. 根据太阳能板的电压自动判断夜间或白天
8. PWM 控制功能，PWM 的频率约 30HZ
9. 电池接反保护功能

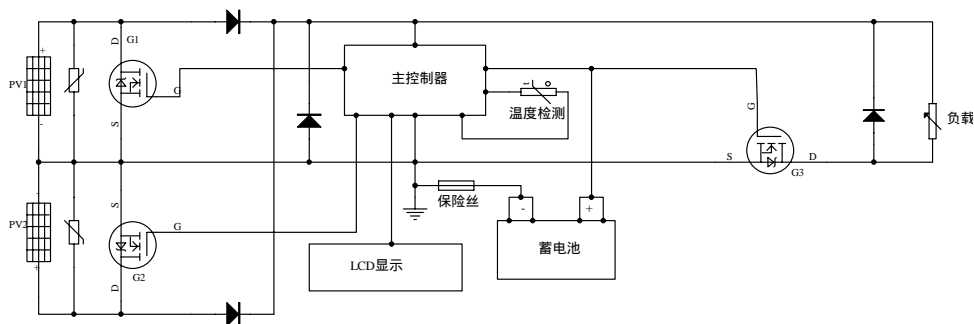


### 系统框图



### 技术指标

- 额定电压: 24 伏



- 充电电流: 两路, 15A/每路
- 放电电流: 30A
- 过放保护电压: 小于  $21.6V \pm 0.2V$
- 过放恢复电压: 大于  $24.8V \pm 0.2V$
- 过高保护电压: 大于  $35.0V \pm 0.2V$
- 过高恢复电压: 小于  $30.0V \pm 0.2V$
- 第一路充电电压: 小于  $30.0V \pm 0.2V$ (回差 0.5 伏)
- 第二路充电电压: 小于  $29.0V \pm 0.2V$ (回差 0.5 伏)
- 空载电流: 小于 15 毫安
- 允许环境温度: -25 ---+50
- 温度补偿: -40 毫伏/

注: 对于 12V 系统除所有电压值减半.

本公司具有多年生产光伏控制器的设计经验和大量的用户,产品质量稳定\可靠性高\可适应各种恶劣场所。