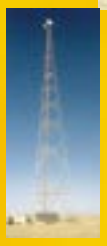
SOLLATEK SCC



SCC
Solar control centre

THE SOLLATEK SOLAR CONTROL CENTRE (SCC)

A state of the art, microprocessor controlled solar charge controller for professional medium and large-scale solar powered systems.

The SCC is the product of over ten years experience in the field of solar power. It combines optimal battery charging characteristics with flexible load allocation options and numerous displays and alarms.

The battery charging current is widely variable in smooth steps from very low level trickle charge to high current rapid charge for deeply discharged batteries. This ensures maximum possible battery life with little or no electrolyte gassing.

The outputs to the loads may be switched according to two independent criteria. If the battery charge level becomes extremely low, the loads may be shed in a pre-determined order, maintaining supply to critical loads for the maximum period. Loads can also be turned on and off according to built in timers.

There are a number of alarms which give indications of various important parameters such as overvoltage and overload. There are user-controlled settings such as load on/off timers and high voltage disconnect level. The unit is suitable for use with many different battery types. The type in use may be selected to enable the SCC to utilise optimum charge/discharge characteristics for the particular battery. These amongst many other features make the Sollatek SCC the most advanced solar controller available in the world today.

Sollatek™
Solar Systems

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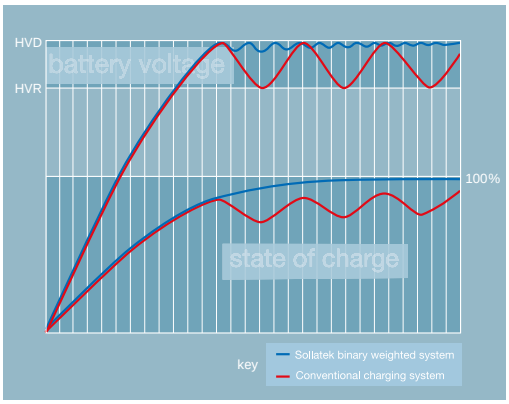
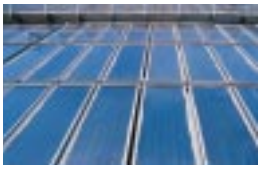
SCC Solar control centre

Features

- Microprocessor controlled
- Very low current consumption
- Proprietary solid state switching without MOSFETS
- Reverse solar current blocking without diodes
- Multistage charging to attain optimum battery charging capacity
- Load prioritisation through load shedding
- LCD displays: solar V, I, battery V, I, temp, load I
- Many LED indicators (8 solar O/P, 8 load O/P, 7 segment status, 11 alarms, and others)
- Eleven alarm relays and LEDs to indicate many conditions such as low voltage disconnect, battery full, system status, warning and faults etc.
- Buzzer to indicate warning: On 1 second, off for 30 seconds. Buzzer to indicate fault: on 1 second, off for 5 seconds.
- Five easily settable timers with dusk-dawn, 1-10 hour timer and auto run
- Fully field settable voltage limits: HVD, LVD, HVR, LVR
- RS232 interface (optional)
- Circuit breakers on the load and solar side (optional)
- Extensive spike protection through transorbs and MOVs
- Rugged wall mount metal enclosure
- Four-wire temperature compensation

Binary weighted vs conventional charging system





Charging Principle

There are two possible factory preset configurations for charge control. These are binary weighted and unweighted charge control, both using switching modules to control battery charge current.

Unweighted charging gives the maximum possible charge current for a given number of switching modules. The number of charge levels is restricted to the number of switching modules fitted. This system gives better charge control accuracy than most commercially available controllers.

For maximum battery charge control, a **binary weighted charging system** is adopted. Control is achieved using a binary switching technique whereby the incoming solar current is passed through up to eight solar switching modules/module groups, each of which can be turned on or off independently by the microcontroller.

Number of module channels	Max number of charge levels/steps	Resolution as % of total array
1	1	100
2	3	33
3	7	14
4	15	6.7
5	31	3.2
6	63	1.6
7	127	0.8
8	255	0.4

Binary weighted battery charging characteristics

Battery voltage and charge current are closely controlled, minimising shock to the batteries and preventing formation of debris on the plates.

Load Control

Load current control is effected using the same type of switching module as is employed for charge control. Up to eight loads may be controlled; each rated at up to 30 Amps. Higher currents may be accommodated by paralleling.

Where multiple loads are supplied, these can be allocated a priority to enable them to be sequentially disconnected in the event of low battery voltage, allowing the main load to continue functioning as long as possible.

Loads can be switched on and off automatically by using the five built in timers.

Alarms

There are eleven relays on the PCB, each with an associated LED to indicate battery state and various other information requiring attention. The relays can be used to set remote alarms. An internal buzzer will also sound to indicate an alarm condition.

User controls

The following user controls are provided:

- Main on/off
- Maintenance/auto mode (to enable testing of the SCC)
- Reset button
- Alarm mute
- Indicator pause button (to facilitate reading of system status LEDs)
- LVD break button (to force load connection under certain low battery conditions)
- Solar channel test switches
- Load channel test switches

Indications

There are six separate LCD displays indicating all of the critical parameters of the system. These are mounted on the SCC door and are as follows:

Solar Voltage The measured voltage of the solar array
Solar Current The measured total current flowing from the solar array
Battery Voltage The measured voltage of the battery
Battery Current The measured total current flowing in or out of the battery
Battery temperature The temperature measured close to the battery
Load Current The total measured current flowing to the load/s

In addition, there are LED indicators within the cabinet to indicate:

- Solar module status
- Load module status
- SCC status (i.e. error codes – 7 segment)

User settings

There are various system parameters that may be adjusted by the user, to fine-tune the SCC to specific requirements.

HVD - High voltage disconnect (battery voltage at which charging ceases)

HVR - High voltage reconnect (the level below HVD at which charging recommences)

LVD - Low voltage disconnect (battery voltage at which load shedding commences)

LVR - Low voltage reconnect (the level above LVD at which load reconnection commences)

Battery type (optional)

Timers (the user may programme loads to be switched on and off at specific times)

Battery sense (selects between internal or external battery voltage measurement)

Protection

Metal Oxide Varistors: The main PCB is protected against high voltage spikes by the fitting of, amongst other things, Metal Oxide Varistors. These are fitted at the inputs from the batteries, solar modules, temperature sensor and power.

Diode Protection: At various points throughout the circuit, where signals come into or leave the main PCB, such as to the Analogue to Digital converter, a pair of diodes is used to limit voltages, preventing them reaching a damaging level. This helps to protect against spikes, surges and wrong connections.

Transorbs: There is a 1500 Watt transorb connected across the battery input to the master board, where it enters the power supply section. This has the effect of clamping high voltage spikes to a safe level. Spikes of up to 1500W total power are rendered harmless by this device.

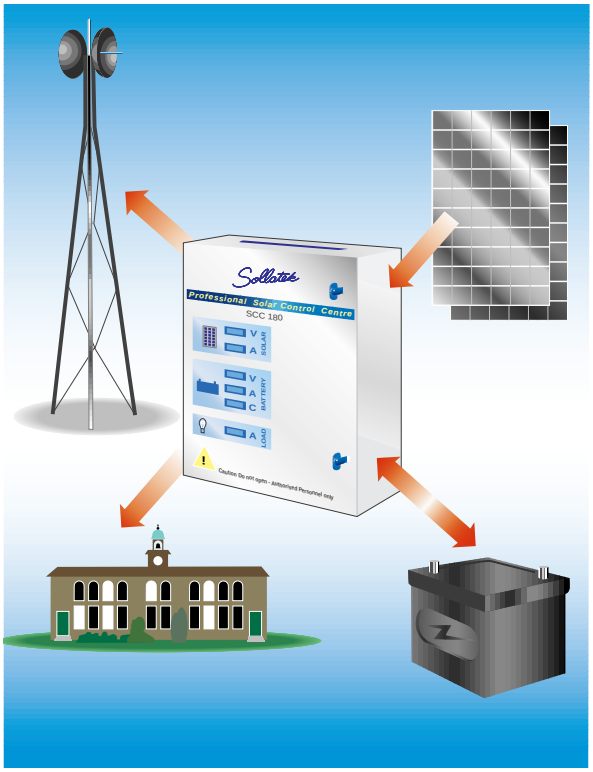
Filtering: Resistor/capacitor filters are used at a number of points in the circuit to protect against damage or disruption caused by spikes, noise and other interference.

Reverse connection: Precautions are taken to protect the circuit from damage should the connections to the board be made backwards. Polarised connections of different types prevent misconnection and electronic means prevent damage if reversal occurs for other reasons.

Transorb PCBs: At the input to the SCC there is a PCB which serves purely as protection against high voltage spikes on the incoming solar feeds. Transorbs rated at 1500 Watts each are fitted between all positive and negative solar inputs. These have the effect of limiting to a harmless level all incoming spikes with a total individual power of up to 1500 Watts. Therefore all circuits further down the line within the SCC are protected. The same circuit board is reproduced at the output of the SCC. It serves to protect the SCC from spikes transmitted back along the cables from the loads. The same 1500W transorbs are fitted.

Solar MCBs: (optional) The individual solar inputs are protected using Miniature Circuit Breakers (MCBs). If currents in excess of the MCB ratings flow along the solar feeds, the MCB will operate, protecting the circuitry within the SCC.

Load MCBs: (optional) The individual load outputs are protected against excessive current by MCBs. If the MCB ratings are exceeded, they will operate, disconnecting the load.



Measurement Methodology

Solar Voltage

Solar voltage is measured by taking the highest of the voltages from the solar arrays via a diode network. This will display the open circuit voltage providing at least one of the solar switch modules is open. If all are closed, the reading will be close to battery voltage, as all the modules will be connected to the battery. The measured voltage is displayed on the LCD readout.

Solar Diode Function

When the Solar current falls to less than 1% of the full current for more than 3 seconds, the solar modules are disconnected. The system then monitors solar and battery voltages. The solar modules will not be re-connected until solar voltage rises to 20% above battery voltage. This prevents battery discharge through the solar modules during darkness. This method requires no Schottky diode, thus saving energy loss due to heating.

Determination of Dawn and Dusk

The SCC measures the open circuit voltage of the modules and uses this to determine when dawn and dusk occur. This is used to start and stop the load timers for things such as the turning on of lights at night. Dusk is considered to have occurred when solar voltage falls to below one twelfth of nominal system voltage. Dawn is considered to have occurred when solar voltage rises above one quarter of nominal system voltage.

Battery Current

The battery current is displayed on one of the LCDs and is the difference between the load and solar currents.

Battery Voltage

The battery voltage may be measured in two different ways. For maximum accuracy, the four-wire measurement system is employed. In this system, separate, non-current carrying wires are used to sense battery voltage. In this way volt drop due to current flow is not a factor.
If the cabling necessary to do this is not present, a two-wire measurement system may be used, for instance to get the system up and running at an early stage of commissioning. It is recommended that a four-wire arrangement is used for the long term operation of the system. The user may select between the two possible methods.

Solar Current

A DC current transducer is used to sense solar current. The output from the transducer is taken to the main PCB where it is suitably scaled and input to the microcontroller via the A/D converter. It is also fed to the LCD displays. The micro uses this current measurement for various functions as described elsewhere.

Load Current

A DC current transducer is used to sense load current as with solar current. This is used for detection of certain errors such as over current, which is indicated by one of the alarm relays. The current measurement is also used for the LCD display.

Battery Temperature

This is measured using a temperature sensing device attached to the battery. This is used for temperature compensation of battery charging voltage at the rate of 3mV/°C/cell as specified by the battery manufacturer.

SPECIFICATIONS

SCC solar Charge Controller	
Nominal system voltage	12V, 24V or 48V
Operating voltage range	10 to 100V
Maximum charge current	90A - 960A in 30A steps
Maximum load current	90A - 960A in 30A steps
Maximum output power	46kW
Technology	Proprietary solid state switching
Over-charge control	Yes
Over-discharge control	Yes
Reverse polarity protection	Yes
Temperature Compensation	Yes (3mV/°C above 20°C)
Internal blocking diode	Not required (saving energy)
Multi-tier charge	Yes (Up to 255 levels)
Alarms (volt free relay contacts)	LVD, Batt Low, Batt Good, Batt Full, Overvoltage, Genset Start, High Temp, Fault, Loads Off, Aux, Buzzer
Indicators	8 off module enable LEDs 8 off load enable LEDs 7 segment error code display
Controls	Solar switching module test switch (test/off/auto) Load switching module test switch (test/off/auto)
LCD Instrumentation	Array voltage, Array current, Battery voltage, Battery current, Battery temperature, Load Current
Current drain	Due to use of solid state devices, the quiescent current consumption of the system is < 100mA (48V unit).
Efficiency at full system power	>99%
Efficiency at 20% full system power	>99%
Input protection	Spikes, surges, lightning, over- voltage and excessive array current.
Output protection	Spikes, surges, lightning, over- voltage and excessive load current.
Temperature range	-25 to +70ºC
Humidity	Up to 100% non condensing
Weight	35kg (180A unit)
Dimensions	800x600x300mm (180Aunit)

Note: This specification includes all options

Key to part numbering

SCC _ _ - _ _ - _ _ _ - ___

Solar SPMs	Load SPMs	Options *See below*	System Voltage

Options
B = Battery to Load Bypass
C = Circuit breakers on all switching modules
R = RS232 interface

SPM = Sollatek Power Module – Rated at 30A

SCC

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visit our website

http://www.sollatek.com

2 YEARS WORLDWIDE WARRANTY
ON ALL SOLLATEK PRODUCTS

Sollatek provides you with full back up support and a two year worldwide warranty on all products, with local support in over twenty countries worldwide.

SCC 11.00

Specifications are subject to change without prior notice.

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Solar Systems

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