

12 VOLT
SOLAR CONTROLLER
4 STAGE CHARGING



WARNINGS – IMPORTANT PLEASE READ

- This charger is designed for indoor and outdoor use and is weather proof
- Do not disassemble the controller. Take to a qualified person if the unit requires repairing
- Lead acid batteries can be dangerous. Ensure no sparks or flames are present when working near batteries
- Eye protection should always be used. Never short circuit the battery
- Given sufficient light solar panels always generate energy even when they are disconnected
- Accidental 'shorting' of the terminals or wiring can result in sparks causing personal injury or a fire hazard. We recommend that you cover up the panel(s) with some sort of soft cloth so you can block all incoming light during the installation. This will ensure that no damage is caused to the Solar Panel or Battery if the wires are accidentally short circuited
- Always install a battery fuse on each circuit including the solar controller
- Do not reverse connect the wires to the solar panel or battery

MOUNTING THE DEVICE

The Solar Controller is mounted as below

The quickest and easiest way to mount the unit is to use the three plastic spacers and self tapping screws supplied and mount the unit to a flat surface.

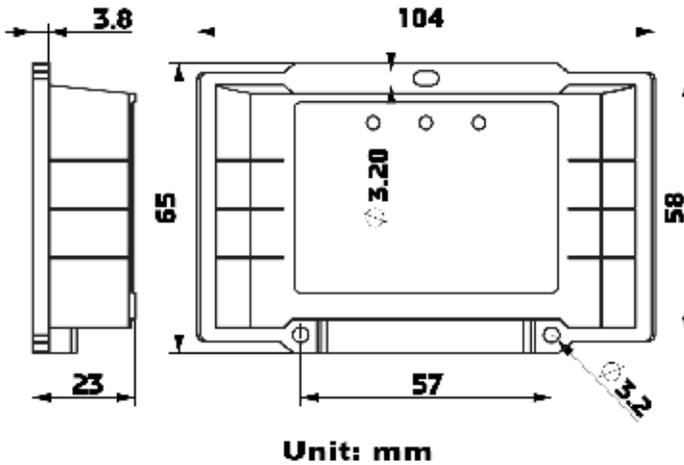


Fig 1.

FEATURES

- 4 Stage charging ensures the battery is charged to the optimum level
- Advanced MCU control pulse width modulated (PWM) technology, high efficiency operation
- Programmable for Gel, AGM, Conventional lead-acid (WET) and Calcium Batteries
- Built in regulator to prevent your battery from being overcharged. Overcharging occurs when the charge voltage is unregulated. This can result in premature battery failure
- In built regulator prevents your battery from being under charged, in the solar energy field, battery undercharge often occurs, especially on some conventional Lead Acid or Calcium batteries; the unit provides an automatic equalization feature for deeply drained conventional Lead Acid battery or Calcium battery, as well as provides a cycling automatic equalizing feature every 28 days
- SC008 & SC015 can be connected to the battery permanently to keep the battery fully charged by using a process called "floating". This means the controller will stop charging when the battery is full and will automatically start charging the battery as required. This process will also reduce water loss and help prevent the battery from 'drying out'
- Protects your battery from discharge at night. Under low light or no light conditions the solar panel voltage could be less than the battery voltage. The unit contains a special circuit which prevents current flowing back from the battery and into the solar panel
- Coloured LED's to easily indicate the charging status and battery conditions and system faulty
- Provides external battery temperature sensor (Optional)
- Multi charging protections against reverse polarity, short circuit, over temperature, over voltage, etc.
- Conformal-coating circuit boards and plated terminals protect the unit in hostile environments
- Waterproof IP65

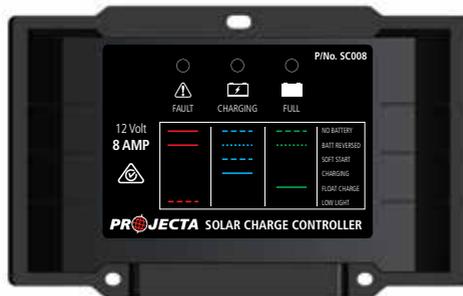


Fig 2.

For use with 12 Volt Solar Panel only. Suitable for solar panels up to 96 Watts (SC008) and 180 Watts (SC015)

WIRING CONNECTIONS

To protect the battery and solar panel, it is recommended that you place an inline fuse on the positive wire of both the 'Solar' and 'Battery' circuits. A 15A fuse for SC008 and a 30A fuse for SC015 is required and should be installed as close to the battery/solar panel as possible

The Solar Controller has 4 terminals which are clearly marked 'Solar' and 'Battery'.

There is a (12V) and earth (GND) terminal for each circuit.

Refer to the wiring diagram below.

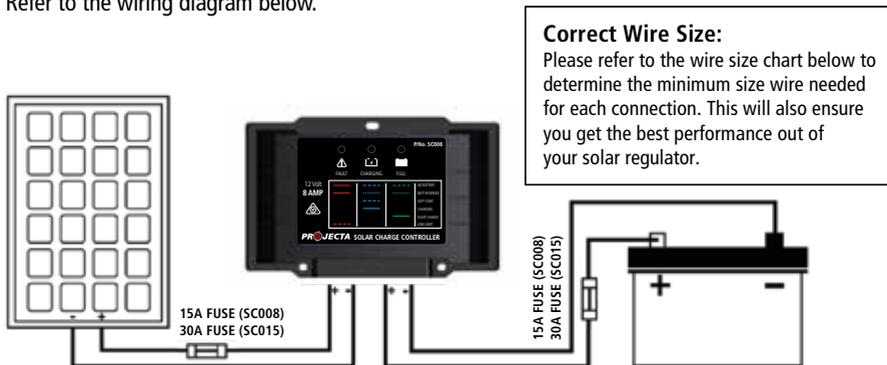


Fig 3.

Length of Wire	P/No	Battery Connection	6m	9m	12m
Size (mm ²)	SC008	< 1m	1.3	2.0	3.3
	SC015		2.0	3.3	3.3

1. Using the string wires, tightly screw the wires to the "Solar" terminal on the back of the controller and connect to the solar panel as shown above in Fig 3.
2. Using the string wires, tightly screw the wires to the "Battery" terminal on the back of the controller and connect to the battery as shown above in Fig 3.

When the connections are completed, the Solar Controller will start working automatically.

Battery type setting – Via DIP switch or External wire

Please check your battery manufacturer's specifications to select correct battery type. The unit provides 4 battery types for selections: Gel, AGM, WET (conventional lead acid), and Calcium.

There is a DIP switch at the back of the solar charge controller, this Dip switch is used for presetting your battery type. Please refer to Fig 4. to set the DIP switch to your desired battery chemistry; the factory default setting is AGM

Note: Once the Dip switch setting is set, do not freely change the DIP switch or external wire connected; otherwise it may damage your battery.

Battery type setting via DIP switch

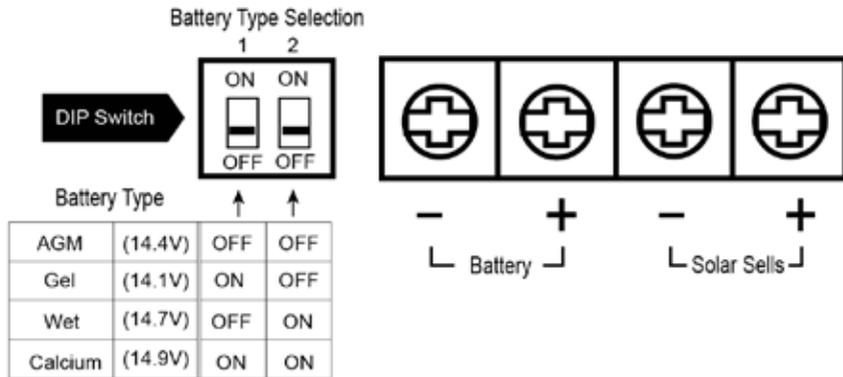
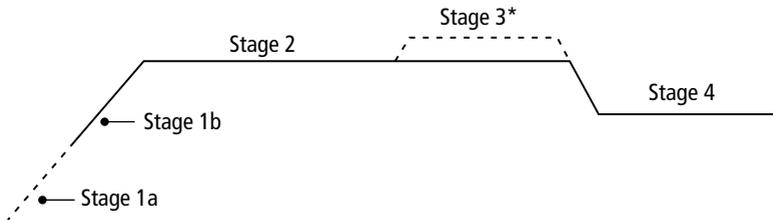


Fig 4.

CHARGING STAGES

The unit has a 4 stage charging algorithm.

Soft Charge – Bulk Charge – Absorption charge – Equalizing Charge* – Float Mode.



Soft Charge (Stage 1a) – When batteries suffer an over-discharge, the controller will softly ramps the battery voltage up to 10V.

Bulk Charge (Stage 1b) – Maximum current charging until batteries rise to Absorption level.

Absorption Charge (Stage 2) – Constant voltage charging when the battery is over 85%.

Equalization Charge*(Stage 3) – Only for WET battery or Calcium battery type, when the battery is deeply drained below 11.5V, it will automatically run this stage to bring the internal cells as an equal states and fully complement the loss of capacity (Gel and AGM battery do not run Equalization charge).

Float Charge (Stage 4) – When the battery is fully charged it is maintain at a safe level.

A fully charged battery has a voltage of more than 13.6 Volts.

OPERATION – L.E.D. INDICATION

The 3 LED's indicate the charging status and Fault connection	Fault Red	Charge Blue	Full Green
Solar Power Present – No battery connected	ON	Slow flash	Slow flash
Battery reversed	ON	Fast flash	Fast flash
Solar panel reversed	OFF	OFF	OFF
Soft start charging	OFF	Slow flash	OFF
Bulk, Absorption, Equalization charging	OFF	ON	OFF
Float charging	OFF	OFF	ON
Solar panel weak	Slow flash	OFF	OFF

Slow flash = 1 Hz flash; Fast flash = 3 Hz flash

SOLAR CONTROLLER SPECIFICATIONS

1 Electrical Parameters		SC008	SC115		
1-1	Rated solar panel amps	8	15	Max.	AMP
1-2	Normal input Solar cell array voltage	15–22	15–22		VDC
1-3	Max. solar cell array voltage (output has no load)	25	25	Max.	VDC
1-4	The controller lowest operating voltage (at solar or battery side)	9V	9V	Min	VDC
1-5	Standby current consumption at night	2	2	Max	mA
1-6	Maximum voltage drop-Solar panel to battery	0.25	0.25	Max.	VDC
2 Charging characteristics					
2-1	Minimum battery start charging voltage	3	3	Min	VDC
2-2	Soft start charging voltage	3–10	3–10	+/-0.2	VDC
2-3	Soft start charging current (50% PWM duty)	Up to 6	Up to 8	AMP	
2-4	Bulk charge voltage	10-14.0	10-14.0	+/-0.2	VDC
2-5	Absorption charging voltage at 25°C				
	– Gel type battery	14.1	14.1	+/-0.2	VDC
	– AGM type battery (default setting)	14.4	14.4	+/-0.2	VDC
	– WET type battery	14.7	14.7	+/-0.2	VDC
	– Calcium type battery	14.9	14.9	+/-0.2	VDC
2-6	Absorption transits to Equalizing or Float condition:				
	– Charging current drops to	10% of bulk current		+/-0.1	AMP
	– Or Absorption Charging timer timed out	4	4		Hour
2-7	Equalization charging active (min 1 hr)				
	– Only for WET or Calcium battery				
	– Battery voltage discharged to less than	11.5	11.5	+/-0.2	VDC
	– Automatic equalizing Charging periodical	28	28		Day
2-8	Equalization charging voltage at 25°C	15.5	15.5	+/-0.2	VDC
2-9	Equalization charging timer timed out	2	2	Max	Hour
2-10	Float charging voltage at 25°C	13.6	13.6	+/-0.2	VDC
2-11	Voltage control accuracy	+/- 1%	+/- 1%		
2-12	Battery temperature compensation coefficient	-24	-24		mV/°C
2-13	Temperature compensation range	-20~+50	-20~+50		°C
3 Protection					
3-1	Against reverse polarity or short circuit at panel side				
3-2	Against reverse polarity or short circuit at battery side				
3-3	No reverse current from battery to solar at night				
3-4	Over temperature protection during charging		65°C		
3-5	Transient over voltage protection with TVS or varistor				
4 Electrical parts					
4-1	Input output terminal		M4 terminals		
4-2	Temperature sensor port or DIP switch				
5 Physical Parameters					
5-1	Controller material		Plastic, Standard ABS		
5-2	Power terminal maximum stranded wire size		#12AWG stranded – 3mm ²		
5-3	Mounting		Vertical wall mounting		
5-4	IP grade		IP65		
5-5	Net weight		Approx. 200g		
6 Environmental characteristics					
6-1	Operating temperature		-25 ~ 50°C		
6-2	Storage temperature		-40 ~ 85°C		
6-3	Operating Humidity range		100% no condensation		

WARRANTY STATEMENT

Brown & Watson International Pty. Ltd. ("BWI") of 1500 Ferntree Gully Road, Knoxfield, Vic., telephone (03) 9730 6000, fax (03) 9730 6050, warrants that all products described in its current catalogue will under normal use and service be free of failures in material and workmanship for a period of one (1) year from the date of the original purchase by the customer as marked on the invoice (see elsewhere for specific warranty period).

This warranty does not cover ordinary wear and tear, abuse, alteration of products or damage caused by the purchaser.

To make a warranty claim the consumer must deliver the product at their cost to the original place of purchase or to any other place which may be nominated by either BWI or the retailer from where the product was bought in order that a warranty assessment may be performed. The consumer must also deliver the original invoice evidencing the date and place of purchase together with an explanation in writing as to the nature of the claim.

In the event that the claim is determined to be for a minor failure of the product then BWI reserves the right to repair or replace it at its discretion. In the event that a major failure is determined the consumer will be entitled to a replacement or a refund as well as compensation for any other reasonably foreseeable loss or damage.

This warranty is in addition to any other rights or remedies that the consumer may have under State or Federal legislation.

IMPORTANT NOTE

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

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