

# 12/24 VOLT 20 AMP AUTOMATIC SOLAR CHARGE CONTROLLER WITH REMOTE CONTROL DISPLAY



# **IMPORTANT SAFETY INFORMATION**

Please read this manual thoroughly before use and store in a safe place for future reference.

## WARNING

- Please read these instructions completely prior to installation.
- Lead acid batteries can be dangerous. Ensure no sparks or flames are present when working near batteries. Eye protection should be used. If mounting on a vehicle follow all manufacturers' instructions.
- 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. It is recommended to cover the front face of the panel(s) with a soft cloth to block incoming light during installation.
- For use with 12V or 24V (nominal) solar panels.
- For indoor, out of weather use only.
- Do not exceed the total limit of the solar controller (240W/20A)

# FEATURES

#### **3 STAGE CHARGING**

Ideal for deep cycle batteries, the SC320D delivers 3 stage charging, maximising battery life and performance. The in-built temperature sensor adjusts the output guaranteeing a thorough charge in all conditions.

- Maintains your battery ready for use
- Safe to leave permanently connected
- Prevents solar over-charge/discharge

#### LOW VOLTAGE DISCONNECT (LVD)

LVD will disconnect the DC load before the battery voltage falls too low, preventing damage due to over-discharge. Once the battery is recharged, the DC load will be automatically reconnected.

#### LOAD CONTROL

The SC320D allows you to switch the DC load on/off from the controller without having to physically disconnect the load or appliance. When switched to 'off', the DC load is isolated from the battery ensuring all available solar power is directed to the battery.

Max Load: 20A

#### **REMOTE CONTROL DISPLAY**

The remote display allows you to control and monitor your power system from a convenient location. Equipped with a large LCD screen and easy to use menu, the remote can be flush mounted or surface mounted and includes 1.5 metres of cable.

#### LCD DISPLAY

Monitor your power system from the backlit LCD display including charge rate, battery level and power usage.

#### **ELECTRICAL PROTECTION**

- Short circuit & over current protection
- Reverse polarity protection
- High voltage protection
- Conformal coated for protection against dust and moisture

### **PRODUCT OVERVIEW**





### **SPECIFICATIONS**

P/No.		SC320D	SC320D		
ТҮРЕ		Automatic	Automatic		
INPUT		12V or 24V	12V or 24V solar panel		
MAX INPUT		50V DC, 20	50V DC, 20A		
MAX LOAD		20A	20A		
LOAD SWITCHING		Negative			
BATTERY		12V or 24V			
CHARGE CONTROL		3 stage charging			
		12V	24V		
Bulk	Gel:	14.1V	28.2V		
	AGM:	14.4V	28.8V		
	Wet:	14.7V	29.4V		
Absorption	Gel:	14.1V	28.2V		
	AGM:	14.4V	28.8V		
	Wet:	14.7V	29.4V		
Float		13.7V	27.4V		
Start		11.1V	22.1V		
		Negative switching			
LVD LOAD DISCONNECT		11.1V	22.2V		
LVD LOAD RECONNECT		12.6V	25.2V		
MAX PANEL SIZE		240W			
STANDBY CURRENT		18mA			

# **MOUNTING INSTRUCTIONS**

#### **MOUNTING THE SOLAR CONTROLLER**

Projecta Solar Controllers are designed for indoor, out of weather use only. Ensure that the solar controller is mounted in a dry and well ventilated area as close to the batteries as possible. The solar controller end plates include a mounting flange for easy mounting. If permanently fixed, mount to a suitable flat surface away from moving parts or high temperature components.



#### **MOUNTING THE REMOTE CONTROL**

The remote control is optional and the SC320 will operate normally with or without the remote being fitted. It can be surface mounted (using supplied base) or flush mounted to best suit your application. Mount to a suitable flat surface in a dry and convenient location.

To install the remote control, connect the supplied data lead to the SC320 and the remote control display.

Mounting opening (flush mounting): 75mm dia.

Cable length: 1.5 metres.

Warning: Ensure the cable is secured safely away from moving parts.

# CONTROLS

The remote control features 4 buttons and an LCD display that allow you to monitor the status of your power system and adjust the settings to best suit your application. You can also turn your appliance on/off directly from the remote control without having to physically disconnect the appliance.

Symbol Description Function Edit Mode Function\* SFT SET Select item to enter Save and return to edit mode reading mode Decrease (-) setting PREVIOUS Go back to previous item -Increase (+) setting -NFXT Go to next item Exit without saving ሪ/ESC POWER • Switch load on/off • Reset (short circuit)

The function of each button is explained with illustrations below.

\*Applies to editable settings only, see VIEWING THE STATUS OF YOUR POWER SYSTEM on page 10.

# CONNECTION

Connections to the solar controller are made via the positive (+) and negative (-) screw terminals at the base of the solar controller. These terminals are illustrated for easy identification:

Symbol	Input/Output	
	SOLAR PANEL	
	BATTERY	
	LOAD	

**Note:** Ensure connections are made to the correct terminals and polarity (+/-). Incorrect installation may cause damage to the battery, solar panel or appliances.

#### **STEP 1 – CONNECT THE BATTERY**

Use suitable cable to connect the battery to the solar controller's BATTERY terminals. It is recommended to install a fuse close to the battery positive (+) terminal. When correctly connected, the BATTERY LED will illuminate. The SC320 will automatically detect if the battery is 12V or 24V.

#### **STEP 2 – CONNECT THE SOLAR PANEL**

Recommended Cable		Recommended Fuse
Up to 3m	3-6m+	
2.90mm <sup>2</sup>	4.58mm <sup>2</sup>	30A

Use suitable cable (refer to manufacturer's specifications) to connect the solar panel to the solar controller's SOLAR PANEL terminals. Ensure the solar panel is of the same voltage as the battery connected in STEP 1. When correctly connected and in sunlight, the SOLAR LED will illuminate and the remote will display a full 'sun' next to the solar panel icon.

CAUTION: Solar panels always generate energy when exposed to a light source, even if they are disconnected. Accidental 'shorting' of the terminals or wiring can result in sparks, which may cause personal injury, and create a fire hazard. It is recommended that the user cover the front face of the panel(s) with a soft cloth to block incoming light during installation.

#### **STEP 3 – CONNECT THE LOAD/APPLIANCE**

Connect the load or appliance to the solar controller's LOAD terminals. Ensure the appliance is of the same voltage as the battery to avoid damage.

NOTE: This device is negatively switched. All 'load' earths must be connected only to the SC320 negative (-) terminal. Any 'Load' that is earthed through or back to the battery will not operate under the control of the solar controller.

### WIRING DIAGRAM



## **OPERATION**

#### VIEWING THE STATUS OF YOUR POWER SYSTEM

Use the NEXT and PREVIOUS buttons to scroll through and view the different displays. The displays are explained in the table below.

	Display	Description
1	* <b># →   →</b>	<ol> <li>Displays solar panel input voltage</li> <li>Displays solar panel charging current (Amps) See page 11 "Adjusting the Settings – Step 3a"</li> </ol>
2	*# =	<ol> <li>Displays battery voltage</li> <li>Displays charging current* (Amps)         <b>*Note:</b> charging current may be a negative value subject to the amount of current being drawn by the load/appliance.     </li> </ol>
3	*# <b></b> ▲ sic <i></i>	<ol> <li>Displays load voltage</li> <li>Displays load current (Amps)</li> </ol>
4	*# <b></b>	<ol> <li>Displays battery capacity (Amp Hours) See page 11 "Adjusting the Settings – Step 3b"</li> <li>Displays controller temperature (°C)</li> </ol>
5		<ol> <li>Displays battery level as a percentage (%)</li> <li>Displays temperature compensation See page 11 "Adjusting the Settings – Step 3c"</li> </ol>
6	★ TYPE 8 8 8 4 AM	<ol> <li>Displays battery capacity (Amp Hours)</li> <li>Displays battery type         See page 11 "Adjusting the Settings         – Step 3d"</li> </ol>
7		<ol> <li>Displays accumulated charge from solar panel (Amp Hours)</li> <li>Displays accumulated charge from solar panel (Watt Hours)</li> <li>Note: To reset data, press SET then POWER</li> </ol>
8		<ol> <li>Displays accumulated power usage (Amp Hours)</li> <li>Displays accumulated power usage (Watt Hours) Note: To reset data, press SET then POWER</li> </ol>

# **ADJUSTING THE SETTINGS**

- **STEP 1** Use the NEXT and PREVIOUS buttons to scroll through to setting you wish to change.
- **STEP 2** Press the SET button to enter edit mode. An icon of a spanner will appear while in edit mode.
- **STEP 3** Use the NEXT and PREVIOUS buttons to adjust the setting to best suit your application.
  - a) Charge Mode:



**III** : 3 stage charging (recommended for most applications)

- ---- : 2 stage charging (use to maintain battery when under load)
- b) Battery Capacity:

Set battery capacity to match your battery (50-5000Ah)

c) Temperature Compensation:

Note: Temperature compensation is factory set at -05mV/°C/2V cell to suit AUST and NZ conditions.

Advanced Users may adjust the compensation to suit the specific application.

d) Battery Type

Set battery type to match your battery (SEL= AGM, GEL= gel, FLD= flooded/wet)

**STEP 4** Press the SET button to save and exit; OR Press the POWER button to exit without saving.

#### **OPERATING THE LOAD/APPLIANCE**

To turn the load or appliance on/off, press the POWER button on either the solar controller or the remote control. When switched to off the DC load is isolated from the battery ensuring all available solar power is directed to the battery.

# **FAULTS & ERRORS**

If the solar controller encounters an electrical problem, it will shut down to prevent damage. The solar controller will display various LED signals to indicate the reason for the fault.

Status	SC320 LED	Remote LED	Remedy			
SOLAR						
Normal	Green	-	_			
Over Voltage	Green (slow flash)	Red	Check solar panel voltage matches battery voltage			
BATTERY						
Full (Float/Absorp)	Green (slow flash)	Green	_			
Normal 12V 12.0–14.6V 24V: 24.0–29.2V	Green	-	_			
Low 12V: 11.1-11.9V 24V: 22.2-23.8V	Yellow	-	Remove load and/or recharge battery			
Load disconnected	Red	-	Recharge battery			
LOAD						
Normal	Red	-	_			
Overload	Red (slow flash)	Red	Check the combined power usage of appliances is suitable for this solar controller			
Short Circuit	Red (fast flash)	Red	Remove appliance and have it checked by a qualified technician			

**Note:** The solar controller is protected against small lightening storms via the TVS lightening protection system. In areas where lightning is prevalent, use a professional lightning proof system. Failure to do so may void warranty.

## **TROUBLESHOOTING/FAQ:**

#### **Q WHY DOES MY BATTERY OVERCHARGE?**

A. Ensure that the solar panel negative cable is wired directly to the SC320D.

The SC320D is negatively switched. This means the negative connection (earth) is used to control the charge supplied to the battery. If the solar panel is earthed/grounded outside of the SC320D (for example connected to the chassis via the vehicle's wiring) it will complete the electrical circuit and bypass the SC320D, connecting the solar panel directly to the battery. This will cause the solar panel to supply peak power to the battery continuously and may result in the battery being overcharged.

#### Q. WHY DOES THE LOAD/APPLIANCE NOT TURN OFF WHEN I PRESS POWER?

A. The SC320D is negatively switched. This means the negative connection (earth) is used to turn the appliance off/on. If the appliance is earthed/grounded outside of the SC320D (for example connected to the chassis via the vehicle's wiring) it will complete the electrical circuit and bypass the SC320D, connecting the appliance directly to the battery. This will prevent the SC320D from being able to turn the load/appliance off.

To convert the SC320D load/appliance to positive switching, install a relay as shown in the following wiring diagram.



Converting Load/Appliance to Positive Switching

#### Q. What does "-5mV/°C/2Volt Cell mean" (temperature compensation)?

A. This means for every degree Celsius increase above 25°C the absorption and maximum bulk voltage will decrease by -5mV/cell. Since a 12V battery has 6 cells and a 24V battery has 12 cells, "-5mV/°C/2Volt cell" equates to -30mV/°C for a 12V battery and -60mV/°C for 24V battery.

Example:

If the environmental conditions are 35°C, and the SC320D is connected to a 12 Volt GEL battery, the absorption voltage would be as follows:-

We need to work out the temperature above 25°C  $35^{\circ}C - 25^{\circ}C = 10^{\circ}C$ 

So the compensation is  $10^{\circ}C \times -5mV = -50mV$  for 1 cell but as a 12V battery has 6 cells the total compensation is:-

 $6 \times -50 \text{mV} = -300 \text{mV}$ 

So the absorption voltage at 35°C on a 12V battery set in GEL mode would be 14.1V -0.3V = 13.8V

Advanced users may adjust the compensation to suit the specific application and environment.

### **NOTES:**

### 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 the 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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