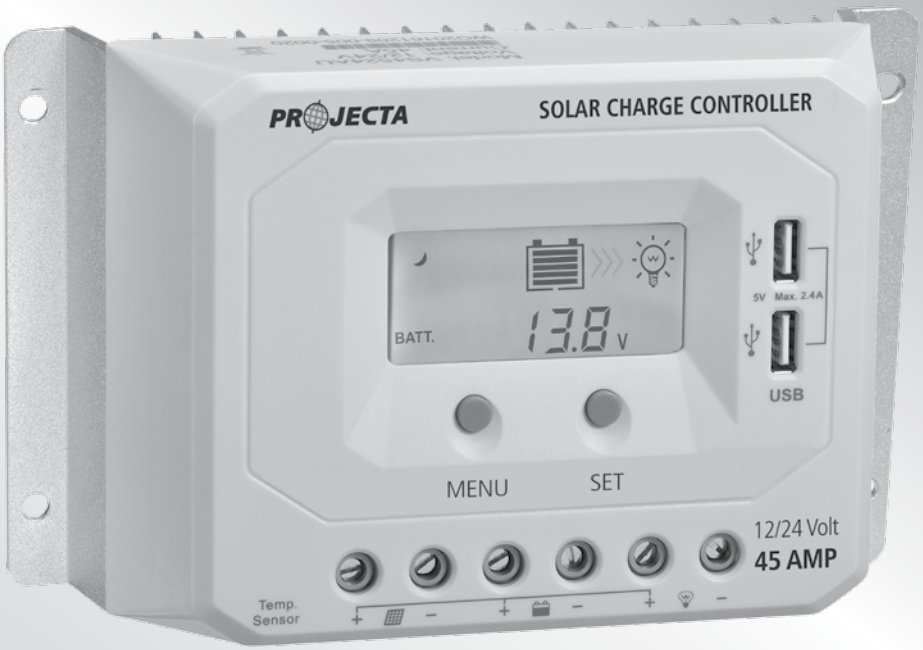
PROJECTA

SMART AUTOMATIC 12/24 VOLT

SOLAR CONTROLLER

4 STAGE CHARGING



P/No. SC220, SC245, SC260

IMPORTANT SAFETY INFORMATION

Please read this instruction thoroughly before installing the product.

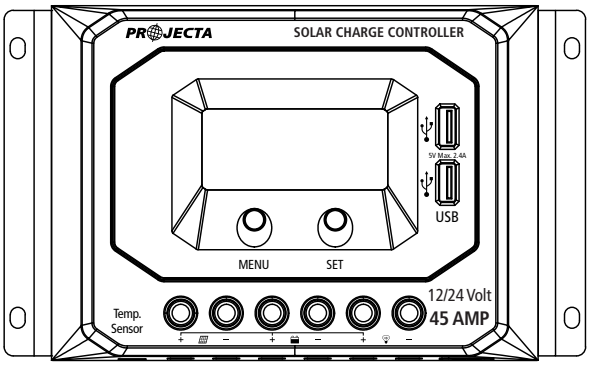
WARNINGS

- This charger is designed for indoor use only
- 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

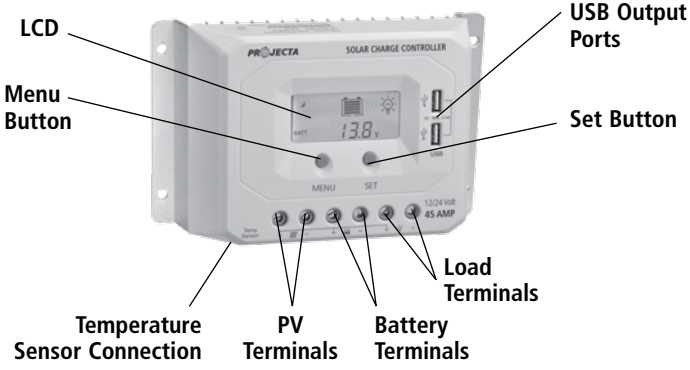
The Solar Controller is mounted as below.

The quickest and easiest way to mount the unit is to use self tapping screws and mount the unit via the four screw holes located on the mounting wings, affix to a flat surface.

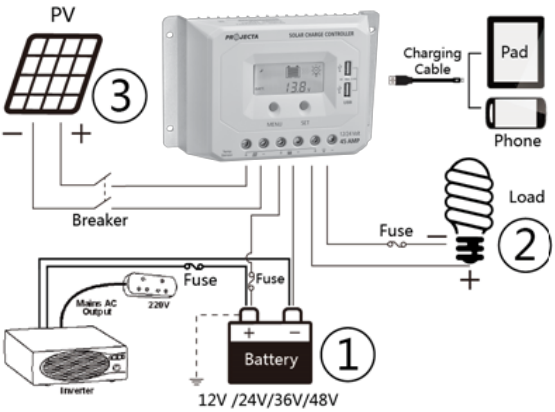


FEATURES

- 4 Stage charging ensures the battery is charged to the optimum level (Bulk, Absorption, Equalisation and Float)
- Advanced MCU control pulse width modulated (PWM) technology, high efficiency operation
- Programmable for Gel, AGM and Conventional lead-acid (WET) 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 batteries; the unit provides an automatic equalization feature for deeply drained conventional Lead Acid and AGM batteries, as well as provides a cycling automatic equalizing feature every 28 days
- The Smart Controllers 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
  - LCD display design, dynamically displays device's operating data and working condition
  - Dual USB ports (5VDC/2.4A combined Max output) allow power supply charge for electronic equipment
- Built-in external battery temperature sensor. Optional sensor probe also available (P/No. SC3TMP)
- Multi charging protections against reverse polarity, short circuit, over temperature, over voltage, etc.
- IP Rating: IP30



WIRING CONNECTIONS



1. Connect components to the charge controller in the sequence as shown above and pay particular attention to the "+" and "-".

   Please don't insert the fuse or turn on the breaker during the installation.
   When disconnecting the system, the order will be reversed.

2. Power on the controller, check the LCD screen turns on. If the screen does not power up, refer to page 9 TROUBLESHOOTING.

   Always connect the battery first, in order to allow the controller to recognize the system voltage.

3. The battery fuse should be installed as close to battery as possible. The suggested distance is within 150mm.

4. The Smart Controller Range is a positive ground controller. Any positive connection of solar, load or battery can be earth grounded as required.

   NOTE: Please connect the inverter or other load that it has the large start current to the battery rather than to the controller, if the inverter or other load is necessary.

OPERATION

Button Function

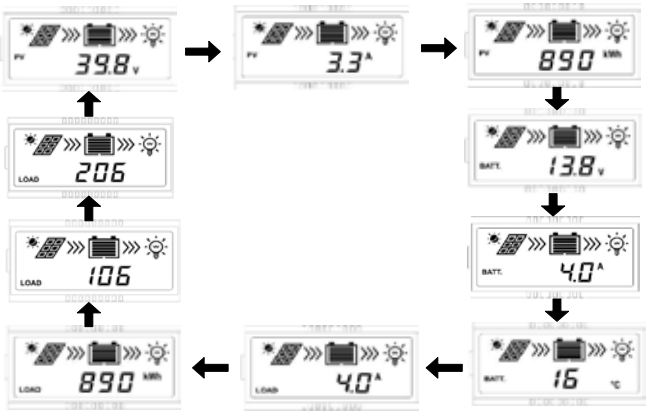
Button	**Function**
MENU Button	• Browse interface • Setting parameter
SET Button	• Load ON/OFF • Clear error • Enter into Set Mode • Save data

LCD Display

Status Display

Item	**Icon**	**Status**
PV Array		Day
		Night
		No Charging
		Charging
	PV	PV Voltage, Current, Power
Battery		Battery capacity, in charging
	BATT.	Battery voltage, current, temperature
	BATT. TYPE	Battery type
Load		Load ON
		Load OFF
	LOAD	Load voltage, current, load mode

BROWSE INTERFACE



NOTE

1. When no operation, the interface will automatically cycle, but the following two interfaces will not display.

2. Accumulative power zero clearing: Under PV power interface, press SET button and hold on 5s then the value blink, press SET button again to clear the value.
3. Setting temperature unit: Under battery temperature interface, press SET button and hold on 5s to switch to Fahrenheit or Celsius.

FAULT INDICATION

Status	Icon	Description
Battery over discharge		Battery level shows empty, battery frame blink, fault icon blink
Battery over voltage		Battery level shows full, battery frame blink, fault icon blink
Battery overheating		Battery levels show current value, battery frame blink, fault icon blink
Load failure		Load overload[1], load short circuit

1. When load current reaches1.02–1.05 times 1.05–1.25 times, 1.25–1.35 times and 1.35–1.5 times more than nominal value, controller will automatically turn off loads in 50s, 30s,10s and 2s respectively

LOAD MODE SETTING

Operating Steps

Under load mode setting interface, press SET button and hold on for 5 seconds until the number begins flashing, then press MENU button to set the parameter, press SET button to confirm.

1**	Timer 1	2**	Timer 2
100	Light ON/OFF	**2 n**	Diabled
101	Load will be on for 1 hour since sunset	**201**	Load will be on for 1 hour before sunrise
102	Load will be on for 2 hours since sunset	**202**	Load will be on for 2 hours before sunrise
103–113	Load will be on for 3–13 hours since sunset	**202–213**	Load will be on for 3–13 hours before sunrise
114	Load will be on for 14 hours since sunset	**214**	Load will be on for 14 hours before sunrise
115	Load will be on for 15 hours since sunset	**215**	Load will be on for 15 hours before sunrise
116	Test mode	**2 n**	Disabled
117	Manual mode (Default load ON)	**2 n**	Disabled

NOTE: Please set Light ON/OFF, Test mode and Manual mode via Timer 1.
Timer 2 will be disabled and display "2 n".

BATTERY TYPE

Operating Steps

Under Battery Voltage interface, press SET button and hold on 5s then enter into the interface of Battery type setting. After choosing the battery type by pressing MENU button, waiting for 5s or pressing SET button again to modify successfully.

Battery Type

1. Sealed (AGM) (default)
2. GEL
3. FLOODED

NOTE: Please refer to the battery voltage parameters table for the different battery type.

PROTECTION

Protection	Conditions	Status
PV Reverse Polarity	When the battery is correct connecting, the PV can be reversed.	The controller is not damaged
Battery Reverse Polarity	When the PV is not connecting, the battery can be reversed.	Stop charging
Battery Over Voltage	The battery voltage reaches to the OVD	Stop discharging
Battery Over Discharge	The battery voltage reaches to the LVD	
Battery Overheating	Temperature sensor is higher than 65° Temperature sensor is less than 55°	Output is OFF Output is ON
Controller Overheating	Temperature sensor is higher than 85° Temperature sensor is less than 75°	Output is OFF Output is ON
Load Short Circuit	Load current ≥2.5 times rated current One short circuit, the output is OFF 5s; Two short circuit, the output is OFF 10s; Three short circuit, the output is OFF 15s; Four short circuit, the output is OFF 20s; Five short circuit, the output is OFF 25s; Six short circuit, the output is OFF	Output is OFF Clear the fault: Restart the controller or wait for one night-day cycle (night time>3 hours)
Load Overload	Load current ≥2.5 times rated current 1.02-1.05 times, 50s, 1.05-1.25 times, 30s 1.25-1.35 times,10s 1.35-1.5 times 2s	Output is OFF Clear the fault: Restart the controller or wait for one night-day cycle (night time>3 hours)
Damaged RTS (Temp. Sensor)	The RTS is short-circuited or damaged	Charging or discharging at 25°

TROUBLESHOOTING

Faults	Possible reasons	Troubleshooting
The LCD is off during daytime when sunshine falls on PV modules properly	PV array disconnection	Confirm that PV wire connections are correct and tight
Wire connection is correct, LCD not display	1) Battery voltage is lower than 9V 2) PV voltage is less than battery voltage	1) Please check the voltage of battery. At least 9V voltage to activate the controller 2) Check the PV input voltage which should be higher than battery's
⚠  Interface blink	Battery over voltage	Check if the battery voltage is higher than OVD point (over voltage disconnect voltage), and disconnect the PV
⚠  Interface blink	Battery over discharged	When the battery voltage is restored to or above LVR point (low voltage reconnect voltage), the load will recover
⚠  Interface blink	Battery Overheating	The controller will automatically turn the system off. But while the temperature decline to be below 50°C, the controller will resume
⚠  Interface blink	Over load or Short circuit	Please reduce the number of electric equipment or check carefully load connection

SPECIFICATIONS

Item	SC220	SC245	SC260
Nominal system voltage	12/24VDC	12/24VDC	12/24VDC
Battery input voltage range	9V–32V	9V–32V	9V–32V
Rated charge/discharge current	20A@55°C	45A@55°C	60A@55°C
Max. PV open circuit voltage	50V	50V	50V
Battery type	Sealed(Default)/Gel/Flooded		
Bulk/Absorption Charging Voltage	Sealed:14.4V/ Gel:14.2V/ Flooded 14.6V		
Equalize Charging Voltage	Sealed:14.6V/ Gel: No/ Flooded 14.8V		
Float Charging Voltage	Sealed/Gel/Flooded:13.8V		
Low Voltage Reconnect	Sealed/Gel/Flooded:12.6V		
Low Voltage Disconnect	Sealed/Gel/Flooded:11.1V		
Self-consumption	≤9.2mA/12V;≤11.7mA/24V		
Temperature compensation coefficient	-3mV/°C/2V (25°C)		
Charge circuit voltage drop	≤0.29V		
Discharge circuit voltage drop	≤0.16V		
LCD temperature range	-20°C+70°C		
Working environment temperature	-25°C+55°C (Product can work continuously at full load)		
Relative humidity	≤95%, N.C.		
Enclosure	IP30		
Grounding	Common Positive		
USB output	5VDC/2.4A(Total)		
Overall dimension	160 x 95 x 50mm	194 x 118.4 x 63.8mm	214 x 128.7 x 72.2mm
Mounting dimension	148x70mm	185x90mm	205x100mm
Mounting hole size	Ø4.5mm	Ø5mm	Ø5mm
Terminals	10mm²/8AWG	16mm²/6AWG	25mm²/4AWG
Net weight	0.35kg	0.76kg	1.02kg

Above the parameters are in 12V system at 25°C, twice in 24V system