Sundaya Apple Regulator

Quick Start Manual

The Apple charge controller is ideal for people living in remote locations where battery protection from excessive discharges is of paramount importance and the cost of battery replacement is very high. To achieve this level of battery protection the loads are connected directly to the Apple charge controller to allow it to turn off your loads when the battery voltage becomes critically low, thus protecting the battery from excessive discharge. You may choose not to use this feature and connect your loads through appropriate fuses or circuit breakers to your battery and not use the Apple load connection. This may be the case if:

- you aren't concerned about your battery replacement cost
- your loads exceed the 5, 10 or 20 amp rating of the apple load controller; and/or
- you have a back-up generator

Main Features:

- 8mm input and output connectors with clear polarity markings
- Extremely low voltage drop over power Mosfets for high efficiency
- Boost Charge mode
- Electronic Overload/Short circuit protection with LED Indicator
- Electronic Master-switch to centrally cut off all loads
- LED voltage indicators for charging and low voltage disconnect
- Low voltage alarm
- PWM charging with temperature compensation

LED Indicators and Button/Switch Description:

- 8-steps Battery Voltage LED: The Battery Voltage level is proportional to the number of the LEDs lit up. State of charge can roughly be equated to voltage when the batteries are at rest (no current flow in or out). All 8 LEDs lit up indicate the batteries are fully charged (Voltage = 12.7 –13.1 V); Only the first (lowest) LEDs lit up indicate the batteries are almost totally discharged and that the output of the controller will soon be cut if the LOAD continues to be connected without sufficient charging to replenish the batteries (Voltage = 11.4 – 11.7V).
- Deep discharge Cut-Off LED: Indicates that the controller disconnected the load output due to battery voltage falling below 11.6 V ± 0.10 V on Penalty mode 11.5V ± 0.10 V on Non Penalty mode.
- Display Button: The LEDs will display the status only when the Display Button is pressed.
- On/Off Master Switch: Toggle the controller output from on to off, or off to on by pressing the switch once.
- Master-switch / Overload/Short circuit LED: This LED will light up when the User turns off the output by pressing the On/Off Master-Switch once, or the controller cuts off the output due to a short circuit detected.
- Charging LED: This LED will light up when charging is taking place.

Installation procedure:

a) Connect the controller to the fully charged battery. (Caution:- please make sure the polarity is correct)
b) Press on the Display Button. All 8 Battery Voltage LEDs should light up if the battery is fully charged.
c) Connect the controller output to the load. Ideally, use low power load first such as a DC lighting product (Ulite3), to verify proper operation. (Caution:- please make sure the polarity is correct, that positive and negative connections are correctly done).
d) Press the On/Off Master-Switch, and hold for one or two seconds, then release. The Load will turn on.
e) Connect the Solar Panel Input to either 12Vdc Solar modules or 12Vdc charger such as DC10. (Caution:- please make sure the positive and negative polarity is correctly connected)
f) The Charging LED should light up if charging is taking place.
g) Mount the controller in indoor environment with minimum exposure to rain, moisture or high temperatures such as near the sink or the stove.
h) The surface to mount the controller on should be of good insulated material such as brick, plastic, or wood.
i) When the Controller is first connected to a half charged battery (Voltage < 12.7V), then the load terminal may be disconnected until the voltage rises above 12.7 volts and the on/off button is pushed. From then on the load terminal will switch off below 11.6 volts.

Safety:

Short circuit of batteries could generate excessive heat and possibly melt down the cables, causing injury to the User. At least one (either the positive or the negative) battery lead should be protected by an appropriate HRC fuse. For the leads supplied with the 5A model we recommend using a fuse rated at 20 amps or less. For the 20A model we suggest you use at least 7.9 mm² battery leads protected by an HRC fuse rated at 45 amps or less. During installation or battery replacement it is advisable to connect and secure the battery cable to the controller first, before connecting to the terminals on the battery.

Warning:

- Although the Apple controllers are reverse polarity protected, the user should ensure correct connection by ensuring all polarity specific connections are done correctly (positive to positive, negative to negative).
- The Apple controllers are designed for indoor use only.
- All solar panels connected to the controller should be 12Vdc, and the current supplied to the controller should be equal to or smaller than the controller's output current.

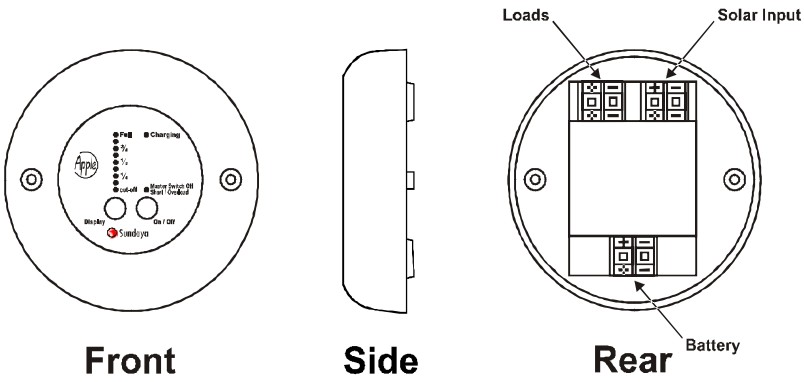
Warranty:

All Sundaya Controllers are warranted for 2 years for any defects caused by faulty components or factory error. The warranty will be void under the following conditions:

- The Product shows signs of having been exposed to moisture or submerged in liquid.
- The Product shows signs of being opened, or warranty seal is broken.
- The Product shows signs of abuse or misuse.

Mechanical Specification:

Enclosure Material : ABS Plastic
Colour : Green
Shape : Round
Size : 120mmØ x 40mm
Terminals : 8mm



Electrical Specification:

Nominal operating Voltage:	12VDC
Self consumption:	4 mA
Current Model Apple	5: 5 Amp -0% +25%
Current Model Apple	10: 10 Amp -0% +25%
Current Model Apple	20: 20 Amp -0% +25%
Low Voltage Buzzer Warning Level:	11.70 V
Low Voltage disconnect:	11.50V ± 0.10V (with discharge current compensation -0.04V/A)
Load Reconnect level:	12.6V
Boost Charge Level @25/C:	14.5V (with Temperature compensation -0.02V/℃)
PWM float Charge level:	14.10V (with Temperature compensation -0.02V/℃)

Fault finding

If you are using the load terminal and the loads won't turn on:

1) When you first connect the Apple regulator to a battery, the load terminal is turned off. The load terminal is turned on by pressing the on/off button. You can check whether the loads are on or off by holding the display button on for about 10 seconds (the on/off light will blink every five seconds indicating the loads are off... if no light blinks, the loads are on).
2) If the cut-off light comes on and stays on, the batteries are very flat and have therefore been disconnected from the loads to prevent damaging excessive discharge. The loads will come back on automatically when the battery has been charged back up to safe level.
3) If there is a wiring fault (short circuit), the on/off light will come on and stay on. The loads can only be reconnected when the wiring problem has been fixed and the on/off button has been pressed to `reset' the load terminal.
4) Check the polarity (positive and negative) of all your loads; some loads will only run if they are correctly wired. Although they will not be damaged, no Sundaya florescent lights work if the wiring is the wrong way round.

The solar panel won't charge the battery (charge light won't come on):

i. Make sure the solar panel is wired correctly (positive and negative are correct).
ii. NOTE: the solar panel cannot be switched on or off using the on/off switch- it is always connected to the battery and will always charge if there is sunlight on the panel.

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19.08.13