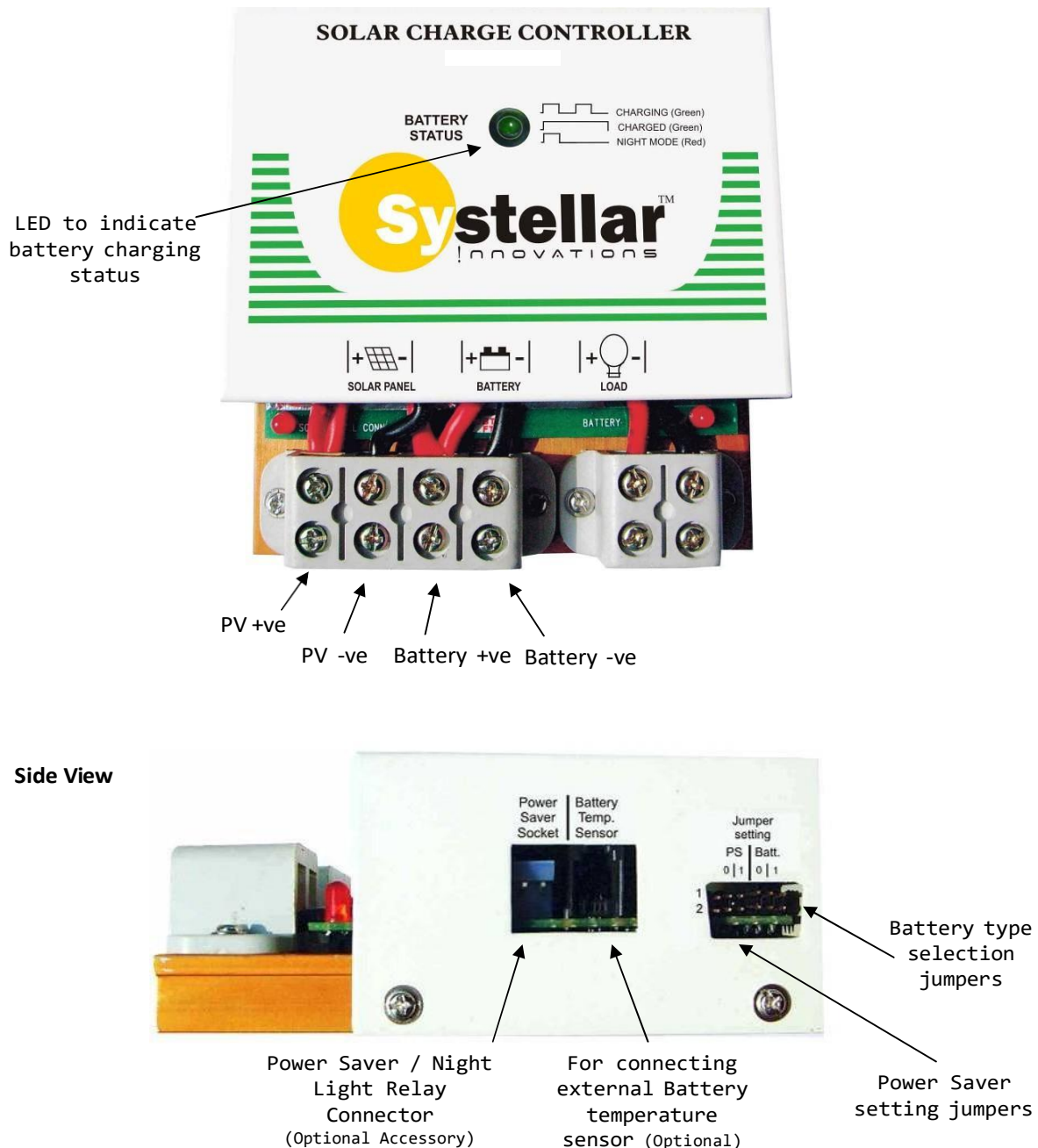# CC-PPL User's Manual 48V

Models available: 48V 20A

Introduction

Congratulations! You are the proud owner of one of the best PWM charge controllers. Please read this manual carefully before installing and operating the charge controller.

This product works with on 48V battery bank and can handle maximum 20 Amps charging current.

Product description

LED to indicate battery charging status

PV +ve   PV -ve   Battery +ve   Battery -ve

Side View

Power Saver / Night Light Relay Connector
(Optional Accessory)

For connecting external Battery temperature sensor (Optional)

Battery type selection jumpers

Power Saver setting jumpers

The following battery types can be selected using jumper settings:

1. SMF (Sealed Maintenance Free)

2. Flooded – Flat plate

3. Flooded – Tubular

A four stage battery charging algorithm best suited for the selected battery type is implemented which can charge battery with precise current and voltage levels to achieve fast battery charging yet ensuring long battery life.

Installing the Charge Controller

1. Install the Charge Controller indoors near the battery bank at chest height. This will make it easy to make connections and make any changes in the jumper settings.

2. For 20A model, connect the battery bank to charge controller using 4 mm^2 copper cables. Keep cable length around 2 Meters. Voltage drop in the cable has been adjusted in the software with these cable dimensions. Observe correct polarity while connecting wires from battery and Solar panel. If the wrong polarity is connected, the Batt connection fault LED will start glowing. Correct the polarity before proceeding further.

4. As soon as the battery cables are connected, the Charge Controller will start working and its Red/green LED indicator will start glowing / blinking.

5. Check open circuit voltage of the solar panels. For optimum results, open circuit voltage of the solar panels should be matched with the battery bank voltage. For 48V battery bank, use four 30 or 36 cell solar panel (Voc = 19V or 21V) in series or two 60 or 72 cell solar panels (Voc = 36V to 44V). You can connect parallel Solar panel strings to this. For 48V CC-PPL, maximum solar panel voltage should be less than 100 volts.

6. Connect solar panel to the charge controller in correct polarity. Once connections are made, if it is day time, the battery charging will start after about 15 seconds.

LED indicator:

CC-PPL has a bi-color (Red / green LED) which gives a variety of indications about the functioning of CC-PPL.

| Condition	Indication
1. System un-calibrated (system fault)	Red: 30 blinks 100 msec On, 100 msec Off
2. Battery discharged	Red: Three 50 msec blinks at 2 seconds interval
3. Load shutoff due to Low Battery voltage or Load current exceeding 20 Amp	Red: Two 50 msec blinks at 2 seconds interval
4. Battery voltage too high (system fault)	Red: Solid On (Unlikely fault)
5. Dusk / dawn verification	Green: Two 50 msec blinks at 2 seconds interval

6. Battery fully charged Green: Solid On

7. During DAY, Charging current < 1 Amp Green: One 50 msec blink at 2 seconds interval

8. During DAY, Charging current > 1 Amp Green: 500 msec On, 500 msec Off

9. During NIGHT Red: One 50 msec blink s at 2 seconds interval

Note that the above is prioritized list of indications i.e. when a higher priority indication is there, any lower priority indication will not be given during that period.
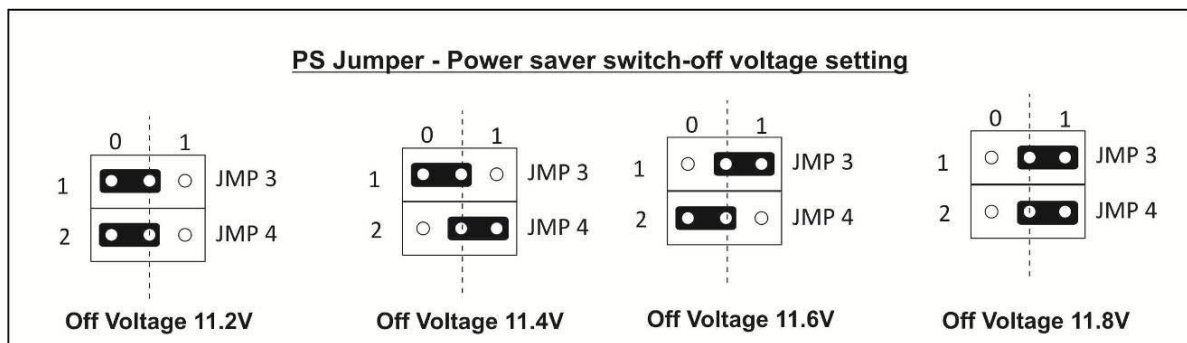
Setting programmable parameters using jumpers

There are two sets of 2 jumpers each on the right side of the CC-PPL. Their settings are as under:

1. Battery type selection (Jmp1 and Jmp2)
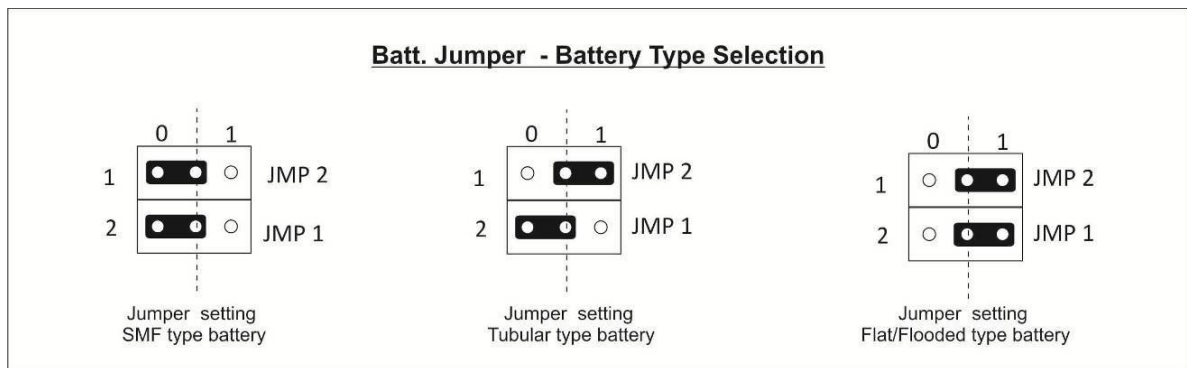
2. Power saver turn off voltage setting (Jmp3 and Jmp4)

For 48V system multiply above voltages by 4 to get actual voltages

Optional Accessories

1. Battery Temperature sensor

| Stick this sensor to the Battery | | To External Battery Temperature sensor connector of CC_PWM |

**External Battery Temperature Sensor**

Battery temperature sensor is supplied as an optional accessory. Paste the temperature sensor on the battery side using adhesive tape. Insert the 4 pin RJ11 connector at the end of the temperature sensor cable in the socket provided on the right side of the charge controller.

Note that if temperature sensor is not inserted in the connector in CC_PPL, the battery charging voltages suitable at 25 deg C are used automatically.

2. Power Saver accessory:

Power Saver Accessory
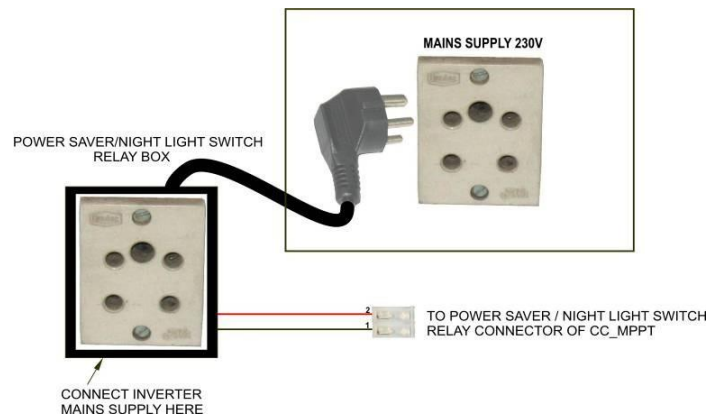
Power Saver Connection Diagram

Connect the plug of power saver box in Mains power socket. Connect inverter mains cord to the socket provided on the Power saver box. Connect the 2 pin PV connector to the Power saver socket on the right side of the charge controller.

Now when it is day and the battery voltage is more than 54 V, the relay will turn on. This will cut-off the mains supply to the inverter and thus save electricity. Note that in this condition, the load connected from the inverter will be driven by the battery while the battery is being charged by the solar panels.

Technical specifications

	CC-PPL-48-20
Maximum charging current	20Amps
Technology	Zero voltage drop Pulse Width Modulation
Battery bank voltage	48 V
Maximum solar panel voltage:	100 Volts
PWM duty cycle range	0 – 100%
Idle current from battery (typical)	10 ma typical

All SYSTELLAR brand charge controllers have excess PV panel protection. The charge controller delivers only the rated maximum charging current to the battery even if excess panels are connected (Solar panel V_{oc} – PV Open circuit voltage cannot be exceeded from specified value)

Note: For product enhancement, product parameters can be changed without notice