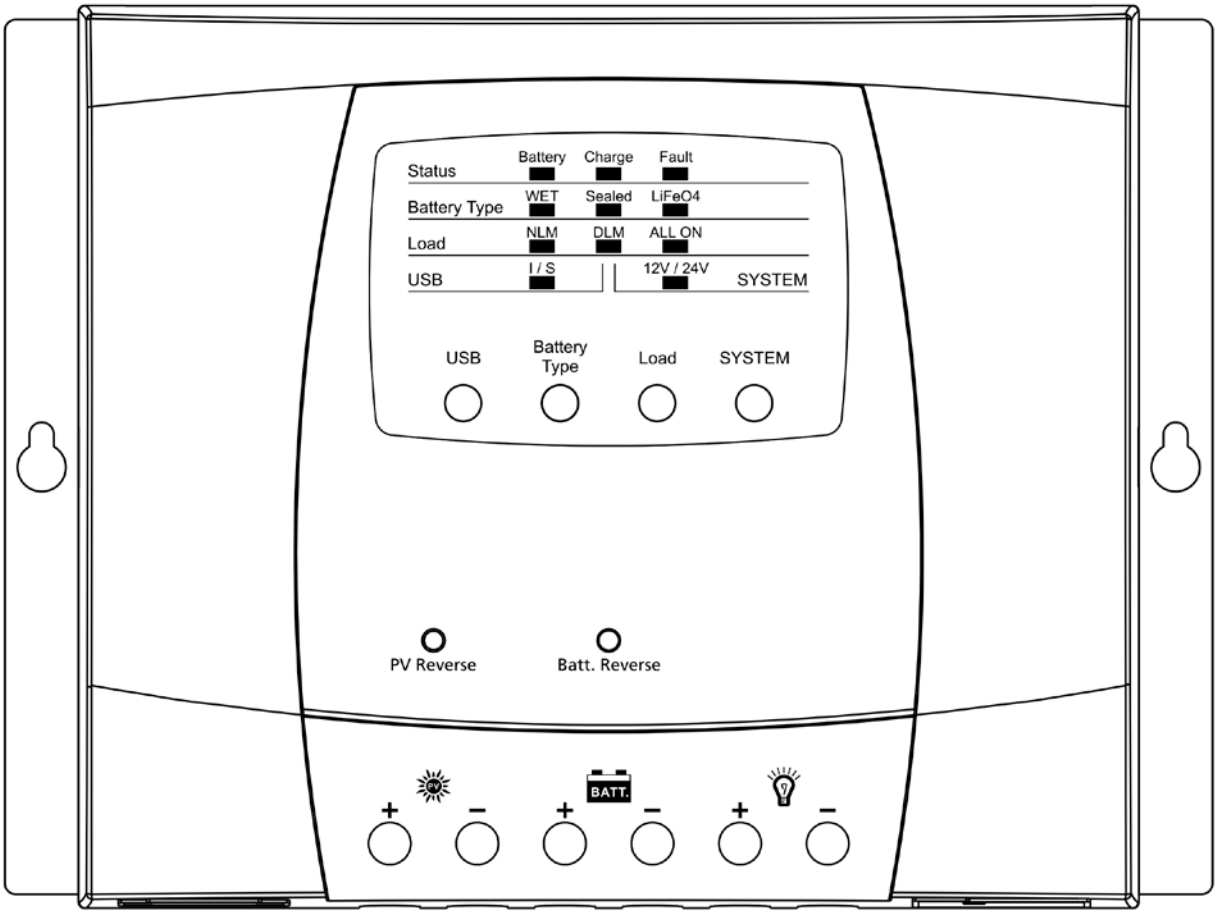
# PVC-7820

## 12/24Vdc 40A Programmable PV Charger Controller

## User's Manual



## Precautions

1. Before using the charge/load controller, read all the instructions and cautionary markings on the charge/load controller, the batteries and the photovoltaic panels.

2. Do not attempt to repair the controller. Incorrect re-assembly may result in a risk of electric shock or fire.

3. To reduce risk of electric shock, disconnect all wiring before attempting any maintenance or cleaning. Turning off controls will not reduce this risk. PV panels produce power when exposed to light – cover them with opaque material before servicing.

4. Working in Vicinity of a Lead Acid Battery is dangerous. Batteries generate EXPLOSIVE gases during normal operation. Provide ventilation to outdoors from the highest point of the battery compartment.

5. Be extra cautious to reduce the possibility of dropping a metal tool onto batteries. It might spark or short-circuit batteries or other electrical parts that may cause explosion. Cover wrench handles with plastic tape or vinyl dip coating material.

## Specifications

| | 12V Batt. System | 24V Batt. System |
|---|---|---|
| System Battery Operation Range | 4-16V nominal<br>12V | 8-32V nominal<br>24V |
| Max. Continuous PV Open Circuit Voltage | 30V | 60V |
| Max. Charging Current | 20A | |
| Max. Output Current at Load Terminal | 20A | |
| Battery type | Bulk | Float |
| WET | 14.7V | 13.4V |
| Sealed | 14.4V | 13.6V |
| LifeO4 | 14.6V | 14.4V |
| Battery Low Voltage Disconnect (LVD) | 11.5V | 23V |
| LVD Delay Time | 5 minutes | |
| Battery Low Voltage Reconnect (LVR) | 12.8V | 25.6V |
| LVR Delay Time | 5 minutes | |
| Protections | | |
| Over Temperature Protection (Self Recoverable) | Yes | |
| Over Voltage Protection at PV Terminal | Yes | |
| Over Voltage Protection at Battery Terminal | Yes | |
| Over Charge Current Protection (Self Recoverable) | Yes | |
| Over Current Protection at Load Terminal<br>(Self Recoverable) | Yes | |
| Battery Reverse Polarity Protection<br>(Self Recoverable) | Yes | |
| PV Reverse Polarity Protection (Self Recoverable) | Yes | |
| USB Charging Port for Apple iPad, iPhone and Tablets Smart Phone | 5VDC 1A Max. | |
| Remote Temperature Sensor | Yes | |
| Operation Ambient Temperature Range | -10 to +50°C | |
| Dimension (L x W x H) | 150x200x64mm 5.9x7.9x2.5inch | |
| Weight | 1.1kg 2.5lbs | |

## Table of Contents

# 1. Introduction

- The PVC-7820 PV Charge Controller is designed for use with all types of 12V and 24V Photovoltaic (PV) panels/ system and different type of 12V/24V batteries.
- Suitable for PV panels with Open Circuit Voltage

| System Voltage | PV panel open circuit voltage range |
|---|---|
| 12V | 17Vdc – 30Vdc |
| 24V | 34Vdc – 60Vdc |

- Rated charging current and load current are 20Amp
- PWM Charging,
- Build-In Microprocessor for PV charge control to maximize the charging efficiency,
- Overcharge and Over-discharge Protection,
- 3-stage Charge Control (Bulk, Absorption & Float) to allow battery be left unattended for long period,
- Over Temperature Protection,
- Short-Circuit Protection at load terminal & Battery Reverse Polarity Protection at Battery Connection Terminal,
- Temperature Sensor for compensated battery charging,
- Remote Signal Terminal.

## 2. Control and Indicator

The following diagram shows the hardware interface of the PV Charge Controller.

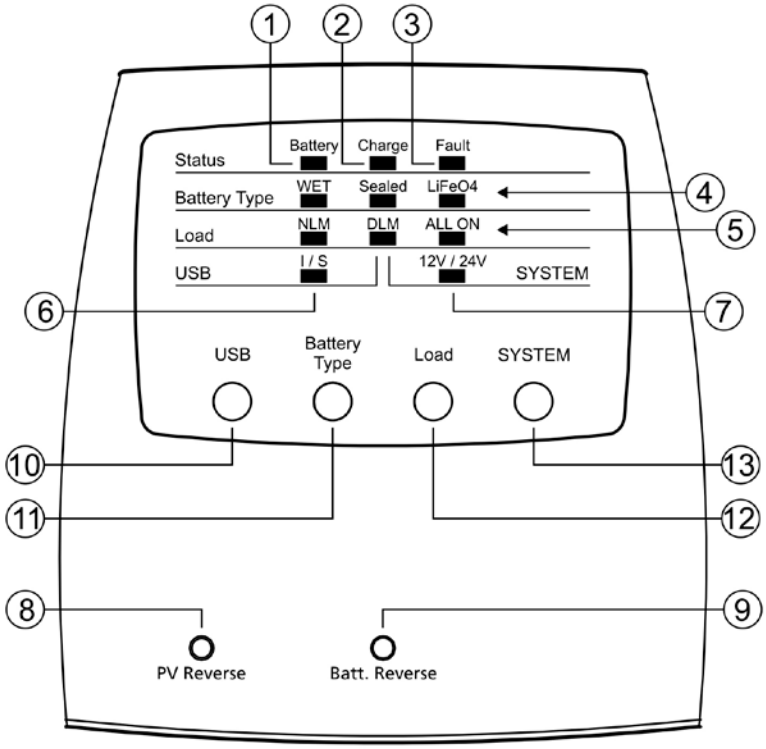



***Figure. 1 Front view of PV Charger Controller***

### LEDs

1. Battery status indicator
2. Charging status indicator
3. Fault indicator
4. Battery Type indicator
5. Load terminal ON/OFF program selection
6. USB charging port selection
7. 12/24V system selection
8. PV Reverse polarity
9. Battery Reverse polarity

### Buttons

10. USB charging port setting button
11. Battery Type selection button
12. Load ON/OFF selection button
13. System voltage selection button

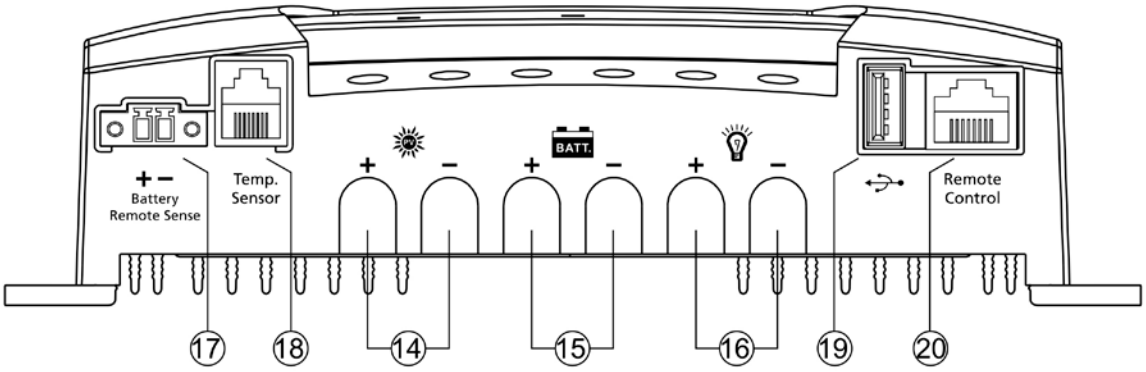



***Figure. 2 Connection port***

**<u>Connection Ports</u>**

14. PV terminal
15. Battery terminal
16. Load terminal
17. Battery Remote Sense terminal
18. Battery Temperature Sensor connector
19. USB charging port
20. Remote control extension

# 3. Operation

## 3.1 Connection

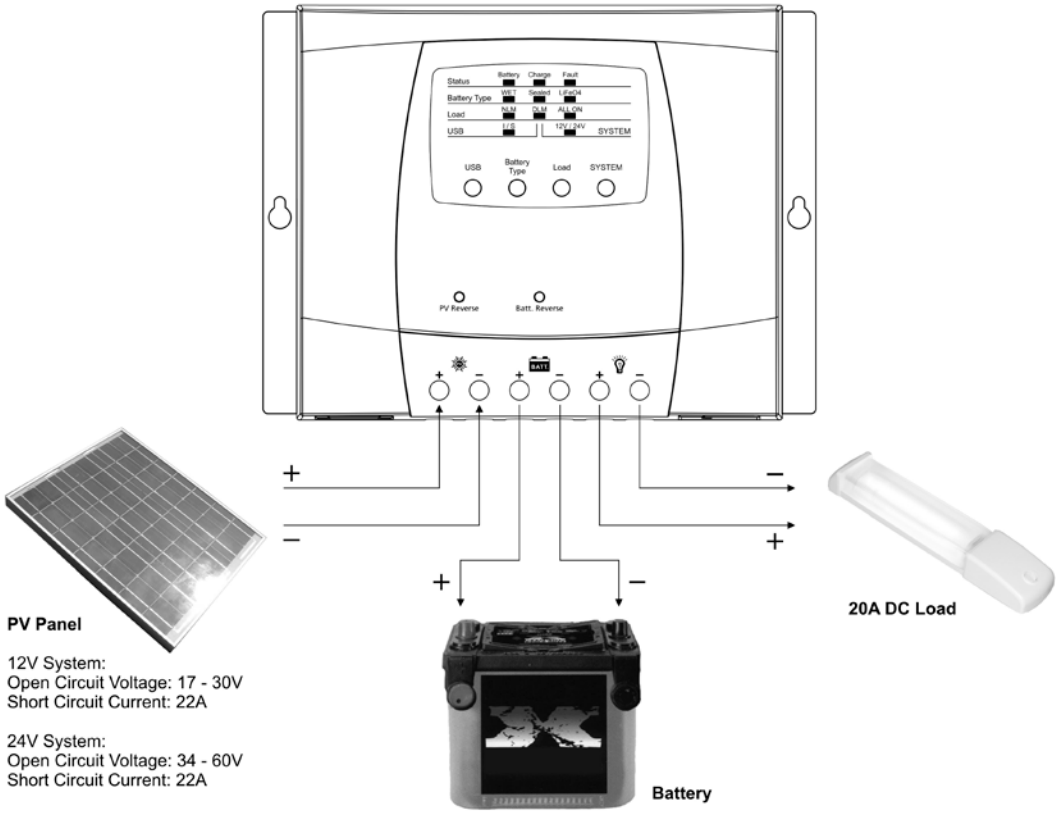



***Figure. 3 Connection of PV Charge Controller***

## 3.2 Select System Voltage

The system voltage only can be selection within 1 minute after power up. If leave it for 1 minute without any action, the system will set with previous setting.

The LED indication;

| System Voltage | LED color |
|---|---|
| 12V | Green |
| 24V | Orange |

Setting Steps;

i) Disconnect PV and Battery terminal.
ii) Connect Battery Terminal.
iii) Within 1 minute, press System button to selection system voltage. Green color for 12V system, Orange color for 24V system.
iv) Press and hold System button to confirm selection

The PV Controller will go into self test mode with all LED on after 1 minute from power up.

## 3.3 Select Battery Type

After PV controller up and run, you can set the battery type.
Voltage for different battery type;

| Battery Type | Bulk voltage | Float voltage |
|---|---|---|
| WET | 14.7V | 13.4V |
| Sealed | 14.4V | 13.6V |
| LifeO4 | 14.6V | 14.4V |

- Press and hold Battery Type button to switch to next battery type.
- The battery type setting will rotate in following sequence

WET → Sealed → LiFeO4 → WET …...

## 3.4 Set LOAD ON/OFF program

The LOAD terminal can be programed to switch ON/OFF in following selection

| Program | LED indication | Description |
|---|---|---|
| Always ON | ALL | The LOAD terminal will switch ON all the time. |
| Night Light Mode | NLM | The LOAD terminal only switch ON after sunset and switch OFF after sunrise. |
| Day Light Mode | DLM | The LOAD terminal only switch ON after sunrise and switch OFF after sunset. |

- Press and hold LOAD button to switch to next LOAD output ON/OFF program.
- The LOAD output ON/OFF program will rotate in following sequence.

NLM → DLM → NLM&DLM → ALL ON → ALL OFF → NLM…...

## 3.5 USB Charging port selection

The USB charging port can be used to charge iPad, iPhone, Android Tablet and SmartPhone.

| Port status | LED color |
|---|---|
| iPad/iPhone support | Orange |
| Android Device support | Green |
| No Charging | OFF |

- Press and hold USB button to switch different USB charging port setting.

## 3.6 Status LED indicators

Battery status indicator – Green/Red LED

| LED | 12V | 24V |
|---|---|---|
| Green Flashing | Battery Voltage = Bulk Voltage | Battery Voltage = Bulk Voltage |
| Green Solid | Battery Voltage >= 12.6V | Battery Voltage >= 25.2V |
| Red Flashing | Battery Voltage <=12.6V | Battery Voltage <= 25.2V |
| Red Solid | Battery Voltage <=LVD | Battery Voltage <=LVD |
| Orange | Battery Voltage < LVD, LOAD OFF | Battery Voltage < LVD, LOAD OFF |

Charging status indicator

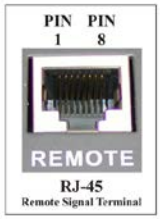
| Stage | Description | |
|---|---|---|
| Bulk | Fast Flashing | ▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪ |
| Absorption | Slow Flashing | ▬▬ ▬▬ ▬▬ |
| Float | Incident on | ▬ ▬ ▬ |

## 3.7 Remote Signal Terminal

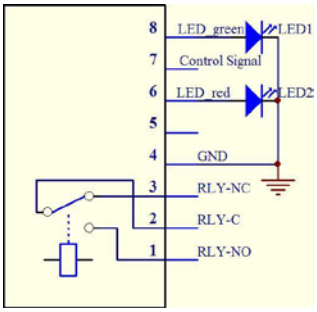
The PV controller has an optional remote signal output terminal which can:

- Used to control the ON/OFF operation of equipment such as inverter hooked up to the battery bank to operate along with the night-light mode program and share the safeguard function such as low battery disconnect and reconnect.
- Extend battery status LED to allow remote monitoring Battery bank status.

RJ-45 Pin Configuration;




RJ-45 Pin Connection diagram



Pin assignment

| Pin | Function description |
|---|---|
| Pin 1 | Relay (Normal Open mode) @Max. 0.2A<br>Synchronized with the LOAD Positive Terminal output On/Off signal |
| Pin 2 | Relay Common @Max. 0.2A |
| Pin 3 | Relay (Normal Close mode) @Max. 0.2A<br>Opposite to the LOAD Positive Terminal output On/Off signal |
| Pin 4 | GND |
| Pin 5 | NC |
| Pin 6 | RED LED signal<br>$I_f$@Max. 30mA, $V_f$@1.8-2.4V |
| Pin 7 | LOAD Positive Terminal signal (12V @Max. 0.1A) |
| Pin 8 | GREEN LED signal<br>$I_f$@Max. 30mA, $V_f$@2-2.6V |