MPPT Solar Charge Controller

Features

- **Increases charge efficiency by 20% - 43%**

- **High technology MPPT with LCD display, efficiency > 98%**

- **Employs a DC converting circuit, conversion efficiency > 96%**

- **MPPT demo displays the efficiency of this controller compared to PCM models**

- **Functions as a power meter**

- **LCD display shows the battery voltage, charging current, charging power, output status, output mode, time and accumulated power saving**

- **Suitable for a wide range of batteries**

- **Maximum charge and discharge current 20A**

- **Five output modes: Manual, Standard, Timer, Light sensor, Light sensor on + Timer off.**

- **Built in timer, suitable for a periodic discharge system such as solar street lights, solar pumps etc.**

- **Over charge, over discharge, overload and short circuit protection**

- **3-stage charging algorithm, impulse, bulk and float**

- **Fully Aluminium housing incorporating a large heat sink**

● **Low stand-by power consumption**

Specifications

Item No.	ECO-MPPT-20A
Rated system voltage	12V/24V DC
Max open circuit voltage of solar panel	15— 50V DC
Max solar panel power	300W 12V/ 600W 24V
Max output current	20A
Max discharge current	20A
Over discharge voltage	10.2—12.5V (±0.2) 12V/ 20.4—25.0V (±0.2) 24V
Restart voltage	10.3—13.5V (±0.2) 12V /20.5—27.0V (±0.2) 24V
Constant voltage（Over charge）voltage	13.0—15.5V (±0.2) 12V / 26.0—31.0V (±0.2) 24V
Float voltage	12.5—14.5V (±0.2) 12V / 25.0—29.0V (±0.2) 24V
Converter type	Buck
Converter efficiency	> 96%
Max increase efficiency	> 43%
Tracking efficiency	> 98%
Precision of clock	±50S/Month
Charging algorithm	PWM 3 stage
Stand by power consumption	<15mA 12V / <25mA 24V
Operating temperature	-20 to +50℃
Protect class	IP22
Size	140(L) × 147(W) × 42(H) (mm）
Weight	550g

★(1) Max input current：Solar panel maximum output current

★(1) Max output current：Controllers maximum output current

Wiring diagram
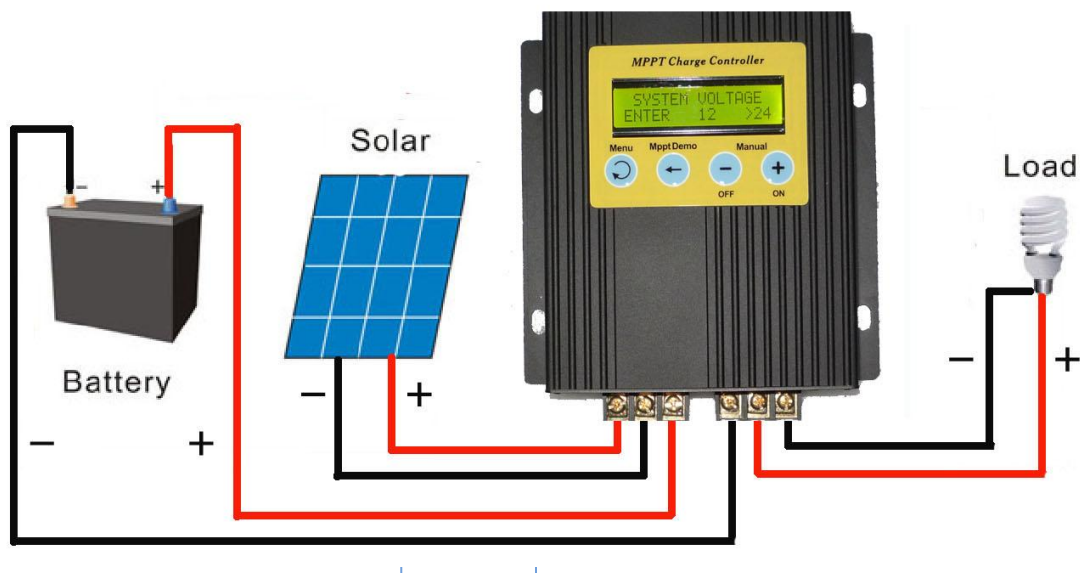
Terminal Block

The terminal block is numbered from left to right as 1.2.3.4.5.6

1: Solar panel "+"

2: Solar panel "-"

3: Battery "+"

4: Battery "-"
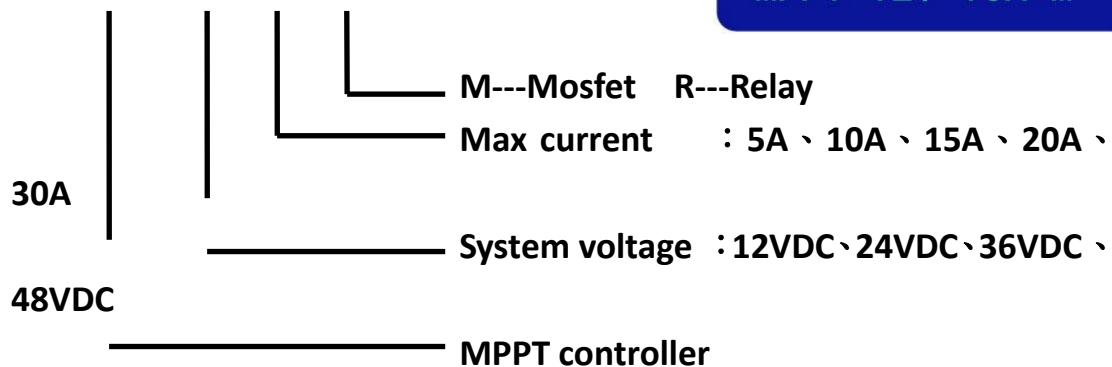
5: Load "+"

6: Load "-"

Startup Screen

Product Code

MPPT-12V-10A-M

```
12V Power System
MPPT-12V-10A-M
```

M---Mosfet   R---Relay

Max current   ：5A、10A、15A、20A、

30A

System voltage   ：12VDC、24VDC、36VDC、

48VDC

MPPT controller

Installation

1、Note：

　1）、Make sure the voltage of the solar panel is within the range of the controllers acceptable voltage

　2）、Make sure the voltage of the battery is within the range of the controllers acceptable voltage

3）、 **Suggested cable for the solar panel connection is 4mm2 copper core, 6mm2 cable for**

the battery connection

Locate the battery as near as possible to the controller

4）、 **Earth and lightning protection is needed when the system is installed**

Wiring order

1）、 **Connection order**（**make sure the polarity is correct**）

- **Battery** （**1st**）
- **Load** （**2nd**）
- **Solar panel** （**3rd**）

2）、 **Disconnection order**

- **Solar panel** （**1st**）
- **Battery** （**2nd**）
- **Load** （**3rd**）

Buttons

1: MENU: Switches between the different operating settings

2: MPPT DEMO:

a: Pushing this button can track the max power point of the solar panel connected to this controller

It will calculate the difference between the output of the MPPT controller as compared to a standard PWM **controller, and show the increased efficiency as a percentage**

b: When changing settings, and with the parameters to be changed showing on the display,

use this button to cycle between fields. e.g. Hrs, Min etc.

3: + (Manual ON)

a: In manual output mode, the load will be turned on

b: On the display when setting parameters，adds 1 to the current value

4: - (Manual OFF)：

a: In Manual output mode, the load will be switched off

b: On the display when setting parameters，deducts 1 from the current value
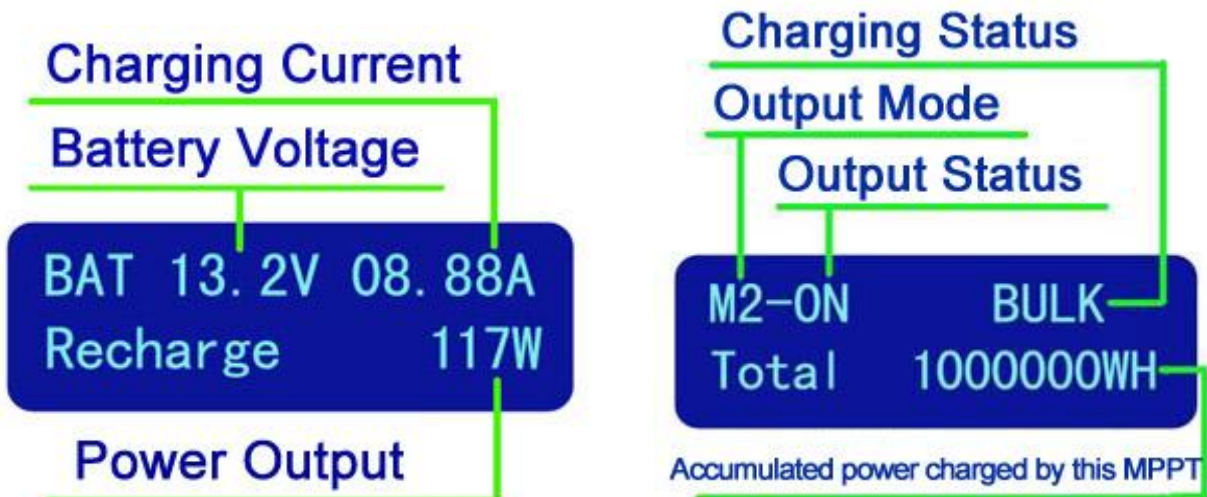
LCD display

Battery voltage choose

```
SYSTEM VOLTAGE
ENTER   12  >24
```

```
Are you sure ?
12V  YES   NO
```

Please program the right system voltage according to your battery voltage, the controller can't work normally before the correct system voltage setting.

If you want change the system voltage , please disconnect the controller for 20 seconds, then you can reset the system voltage.

Charging Current

Battery Voltage

Charging Status

Output Mode

Output Status

```
BAT 13.2V 08.88A
Recharge      117W
```

```
M2-ON        BULK
Total  1000000WH
```

Power Output

Accumulated power charged by this MPPT

a: **BAT 13.2V：Shows the battery voltage in real time (13.2V)**

b: **08.88A：Shows the charging current in real time (8.88A)**

The value showing is higher than the solar panel output current

c: **117W ： Shows the power output equal to the voltage*current (13.2*8.88=117W)**

d: **M2：Output mode (from 1-5)**

e: **ON：Shows if the MPPT function is on or off**

f: **BULK: Shows the MPPT controller status**

1：Sleeping: The controller is sleeping, the current is at the minimum

2：Snoozing: Charging current <0.5A

3：BULK: MPPT the best status

4：ABSORB: constant current charging status, no MPPT function at this

time

    5：**FLOAT: float charging status, no MPPT function**

  g: Total 10000WH shows the total power output by this MPPT controller since install

Function and Parameter setting

Note 1: Please adjust the clock to the right time when you first connect the controller

      2: The MPPT controller keeps the latest setting in memory when you change the value of the constant   charging voltage, discharge protective voltage, discharge restart voltage, float voltage and output mode etc.

1、Over charge voltage setting

    1、push "MENU" until the display shows ABSORB

    2、push "**+**" or "**-**" to change the value

    3、push "MENU" again to return to the main screen

```
*  CHARGE  SET  *
AbSORB         14.4V
```

2、Float voltage setting

    1、push "MENU" until the display shows FLOAT

    2、push "**+**" or "**-**" to change the value

    3、push "MENU" again to return to the main screen

```
*  CHARGE  SET  *
FLOAT      13.7V
```

3、Over discharge protection voltage setting

    1、push "MENU" until the display shows OVER

    2、push "**+**" or "**-**" to change the value

    3、push "MENU" again to return to the main screen

```
*DISCHARGE  SET*
OVER       11.2V
```

4、Discharge restart voltage setting

    1、push "MENU" until the display shows RESTART

    2、push "**+**" or "**-**" to change the value

    3、push "MENU" again to return to the main screen

```
*DISCHARGE  SET*
RESTART    12.3V
```

5、Time Setting

    1、Push "MENU" until the display shows CLOCK SET

    2、Push "←" to switch between hours and minutes

    3、Push "**+**" or "**-**" to change the time setting

```
*  CLOCK  SET  *
           12:00:00
```

4、Push "MENU" again to return to the main screen

6、Output Mode

```
SET OUTPUT MODE1
MANUAL
```
圖

```
SET OUTPUT MODE2
ALWAYS
```

```
SET OUTPUT MODE3
CDS_D        + 10H
```

```
SET OUTPUT MODE4
B-08:00   E-18:00
```

```
SET OUTPUT MODE5
CDS-B        E-18:00
```

MODE1___Manual: Push + (ON)   or − (OFF) the load will be turned on or off

MODE2___Always: Constant output to the load terminals

MODE3___CDS_D/CDS_L + H: light sensor+timer output (by Hour)

a: CDS_D (CDS_DARK)：The load will be turned on when there is no light

b: CDS_L (CDS_LIGHT)：The load will be turned on when there is light

The controller recognizes this by the solar panel voltage

c: Timer range: 0---15 Hours

1: "Timer = 0"   The load will be turned on at sunset and turned off at sunrise

2: "Timer > 0"   The load will be turned on at sunset and turned off after the   number of hours set has elapsed

MODE4___BEGIN_TIME/END_TIME

Timer turns the load on and off automatically

1、When the BEGIN_TIME setting matches the time on the controller, the load will be turned on

2、When the END_TIME setting matches the time on the controller, the load will be turned off

MODE5___ CDS_D/CDS_L + /END_TIME

Light sensor mode for the load to be turned on + Timer for the load to be turned off

1、The load will be turned on when there is no more light

2、When the END_TIME setting matches the time on the controller, the load will be turned off

7：Output Mode Setting

      1、Push "MENU" until the display shows "SET OUTPUT MODE"

      2、When "SET OUTPUT MODE" is flashing push " + " or " - "to switch between the output modes

      3、Push " ← " to switch between the fields of the current output mode

      4、Push " + "or " - " to set the parameter which is flashing

      5、Push "MENU" again to return to the main screen

Special Functions

1、When the LCD shows "ABSORB" or "FLOAT", the charging is not using MPPT,
      it uses PWM to control the precise voltage to protect the battery

2、The converter in the MPPT is the buck type and only charges when the voltage
      of the solar panel is higher than the battery voltage

3、The battery voltage must be higher than the over discharge protection setting,
      this is the precondition for the load to be turned on under all output
      modes

4、The load will be restarted when the battery voltage is higher than the voltage
selected in the over discharge protection setting

5、If the battery is over discharged under the timer output mode, the load will be
cut off, and only restarted when the battery is charged to above the restart voltage
setting

6、When the LCD backlight is off, pushing any button will switch it on again
      The button doesn't have any other effect on functions in this case

7、The LCD backlight switches off if there is no action for 30 seconds

Trouble Shooting

Problem	Solution
The clock is different from your local time	1、 When first connected to the system, the clock defaults to 12:00 Please set the clock to your local time 2、 The clock is accurate to within +/- 50 seconds per month and should be reset occasionally

Battery cannot be charged	3、 Check the battery is in good condition 4、 Check the solar panel polarity is correct 5、 Check the over charging voltage setting is reasonable 6、 Set this value according to the specifications of the battery
No display on the LCD	1、 Check the battery is connected correctly 2、 Check the fuse of the controller is intact and replace if blown
No discharge	1、 Make sure the battery voltage is higher than the setting of the protective over discharge voltage 2、 Set the over discharge voltage according to the specifications of the battery
No charging and no discharge	1、 Make sure the fuse of the controller is intact 2、 Check the battery is connected correctly 3、 Check the Solar panel is connected correctly