# MANUAL V3.0

## SAFETY INSTRUCTIONS

**1.Make sure your battery has enough voltage for the controller to recognize the battery type before first installation.**

**2.The battery cable should be as short as possible to minimize loss.**

**3.The regulator is only suitable for lead-acid,lithium ions and LiFePO4 battery.**

**4.The charge regulator is only suitable for regulating solar modules. Never connect another charging source to the charge regulator.**

## PRODUCT FEATURES

**1.Build-in industrial micro controller.**

**2.Large LCD display,all adjustable parameter.**

**3. PWM charge management.**

**4.Build-in short-circuit protection,open-circuit protection,reverse protection,over-load protection.**

**5.Dual mosfet Reverse current protection ,low heat production.**

**6.This control can work with 0V battery.**

## SYSTEM CONNECTION


**1.Connect the battery to the charge regulator - plus and minus.**

**2.Connect the solar module to the regulator - plus and minus.**

**3. Connect the consumer to the charge regulator - plus and minus.**

**The reverse order applies when deinstalling!**
**An improper sequence order can damage the controller!**

## KEY FUNCTION

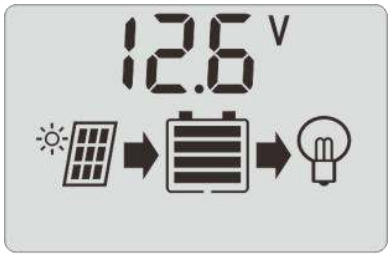
Function 1: when the battery voltage is normal, click the key to turn the load on or off.

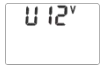
Function 2: press and hold the key for 2s to enter the menu. On the menu where you need to change the setting, press and hold the key for 2s to make the number blink, then click to adjust the setting value, and then press and hold the key for 2s to stop the number blinking, that is to say, the setting is completed.

Function 3: long press the key for more than 10s until F01 is displayed on the screen to restart the controller.

Function 4: press and hold the key for more than 20s until F02 is displayed on the screen to restore the factory settings.

## DISPLAY




NO.1

System voltage type selection interface. The factory default battery voltage type is 12V, i.e. the interface is displayed as u12v. If 24V is needed, it should be set as u24v.
Setting method: long press for more than 2S until the number flashes, then short press for adjustment, and then long press for 2S until the number no longer flashes after adjustment.


NO.2

Battery type
B01=General lead-acid(default)
B02=3S X 3.7V 11.1V lithium ion Battery
B03=4S X 3.2V 12.8V LiFePO4 Battery
B04=AGM / B05=GEL / B06=Flooded
Advise:choose B01 if you don’ t know your lead-acid battery type.
B01-B03 has 2-stage charging process .
B04-B06 has multi-stage charging process.
Setting:hold left key until number flash,click【+/-】to adjust,and hold left key again until number stop flashing ,the setting is saved.


NO.3

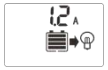
Load output timer control
【24H】-output turn on all the time.
【0H】-output turn on only during Dusk to Dawn(D2D).
【1~23H】-output turn on after sunset and turn off after 1~23H. Attn： no matter which is selected ,output will turn off when battery is in a LVD condition.
Setting method:same as above one.


NO.4

controller’ s body temperature display.if the controller gets too hot during running ,it will automatic shut down and wait for the temperature to drop to normal level ,and then it will work again.


NO.5

Charging ampere display.(only for some model)




NO.6

Discharging ampere display.(only for some model)


NO.7

Charge voltage setting （only for B01,B02,B03）
Different battery types have different maximum charging voltage. Consult your battery supplier for more information.Default setting is recommended.The setting is the same as above.


NO.8

Low voltage re-connect （LVR) setting
When a low voltage disconnect happens,the controller will wait until the voltage raise more then this voltage,then it will re-connect the load again.
Default setting is recommended.The setting is the same as above.


NO.9

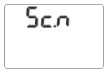
Low voltage disconnect (LVD)setting.
When battery voltage is lower than this voltage,the controller will cut off the output automatically .Default setting is recommended.The setting is the same as above.


NO.10

D2D trigger value(solar panel voltage)
When the work mode is D2D or Timer,the controller will detect the solar panel voltage to decide whether its day or night,so to decide to enable load output or not.the higher this value is,the earlier it enables the load output.
Default setting is recommended.The setting is the same as above.


NO.11

D2D trigger delay value(Second)
When the controller detect the solar panel voltage is lower than trigger value,it will delay for 10S and detect again to make sure night falls, then enable the load output.some car light or thunder lighting will confuse the controller and make it think its daytime,using this delay can prevent interference.
Default setting is recommended.The setting is the same as above.

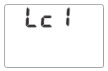



NO.12

Short-circuit protection setting.(only for some model)
Some inductive or capacitive consumer will trigger the short-circuit protection during start up.therefore,you can disable the SC-protection manually.
SC.F=OFF, SC.n=ON.the default is ON.
Default setting is recommended.The setting is the same as above.


NO.13

PWM charging enable(only for B01,B02,B03)
PWM could generate noise and interference which will trigger a high voltage protection in a Li-Battery BMS system.Therefore,to avoid this happen,you can choose to disable the PWM charging.The controller will charge the battery until Setting voltage(Menu NO.3),then it will fully stop charging,when battery voltage drop ,it will re-charge again.
P.oN=PWM ON. P.oF=PWM OFF.
Default setting is P.oN. The setting is the same as above.




NO.14

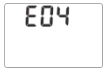
Output mode control.
Normally a LED light connected to the output terminal will work only after sunset,therefore,LC1 can be selected.But some load equipment requires to work only after sunrise,for example,a camera or a pump.therefore ,you can choose LC2.
LC1 and LC2 are logically opposite on D2D control.
If you have set a timer(1-23H)control,for example 16H,but in reality the night /day is only 12Hour.LC1/2 means output work only 12H(any sunset or sunrise will stop the countdown) ,but LC3/LC4 will work 16H(ignore any sunset or sunrise and countdown until setting hours)
Default setting is LC1. The setting is the same as above.

## UNUSUAL DISPLAY


Battery low voltage warning .
To prevent damage of the battery, Output automatic disconnect when battery voltage drop below LVD voltage and automatic re-connect if raise above LVR voltage.
Press button to ignore for one time and force to work again.


Battery high voltage warning .
To prevent damage of the load equipment , Output automatic disconnect when battery voltage raise above HVD voltage and automatic re-connect if drop below HVR voltage.
Press button to ignore for one time and force to work again.


Output over current warning.(only for some model)
Load current exceed rated current.if it does not resume within 60 seconds,it will turn into E04 warning.
Press button to ignore for one time and force to work again.




Output short-circuit warning.(only for some model)
Output automatic disable when there is a short-circuit and will resume after 10 seconds.
Press button to ignore for one time and force to work again.


High temperature warning .
when the temperature of the controller exceeds 80℃, it will enter stand-by mode and stop charging or discharging until the temperature falls to 70℃.
Press button to ignore for one time and force to work again.


PV over-voltage warning .
In order to protect the internal circuit,Charging automatic stop when PV voltage exceed 50V and automatic recover when voltage drop below 45V.(for 12V/24V system)

## FAQ

**Q:why the controller is not showing charging when I connect the solar panel?**
**A:please carefully check the solar panel wires are connected correctly,and there is no reverse.the PV voltage should be higher than the voltage of the battery,any sewage or shadow on the PV will cause the voltage drop.please use a 18v PV to charge a 12V battery under normal circumstances.**

**Q:why is my charging current very small?**
**A:use more solar panel and stronger sun light will increase the charging current,otherwise,using the wrong PV voltage or sewage and shadow on the PV will reduce the charging current.in addition,when the battery voltage is high it will enter float charging mode,also the charging current will become smaller.**

**Q:why my consumer is off?**
**It could be wrong working mode,like setting the work mode to D2D,but you are asking why my consumer is off during the daytime.or battery is not enough and a low-voltage disconnect has happened.or your consumer is broken,to check that ,you can directly connect your consumer to the battery to see if it is working,please carefully check the wires and so.**

**Q:the solar power stored is not enough to supply the consumer**
**A:If the power generated by the solar panel is less than the consumer used,the consumer will have to get the power from the battery storage.and day by day,it will cause a LVD finally at some moment.please use more solar panel and add more battery capacity to prevent cloudy or rainy day,or you can reduce the watt of the consumer or working time to balance the system.**

**Q:why my battery runs out of power very quickly after it is fully charged?**
**A:your battery could have been used for a very long time,and after few hundred of cycling, its dying.a dying battery will not have the capacity to keep the electricity.run a simple test like this,when your charge your battery ,the voltage raise very quickly ,and when you discharge it again,it drops very quickly,this means you should change your battery.**

## TECHNICAL PARAMETER

| System Voltage | 12V/24Vauto | | | 48V | | |
|---|---|---|---|---|---|---|
| MAX.PV input | <50V | | | <100V | | |
| Rated current | 10A | 20A | 30A | 10A | 20A | 30A |
| USB output | 5V/2A | | | | | |
| Charge control | PWM | | | | | |
| Standby lost | <15mA@12V | | <10mA@LVD | | | |
| Working temp. | -20~+60 ℃ | | | | | |
| Size/Weight | 138*85*30mm /150g | | | | | |

## VOLTAGE PARAMETER

| Battery type | B01 General Lead acid | B02 Li- ion | B03 LIFePO4 | B04 sealed | B05 GEL | B06 Flooded |
|---|---|---|---|---|---|---|
| HVD | 16V | 16V | 16V | 16V | 16V | 16V |
| HVR | 15V | 15V | 15V | 15V | 15V | 15V |
| Bulk(Absorption) | 13.7V | 12.3V | 14.0V | 14.4V | 14.2V | 14.6V |
| Equalize | - | - | - | 14.6V | - | 14.8V |
| Float | 13.7V | 12.3V | 14.0V | 13.7V | 13.7V | 13.7V |
| Charge return | 13V | 12V | 13V | 13V | 13V | 13V |
| LVR | 12.0V | 10.5V | 12.0V | 12.6V | 12.6V | 12.6V |
| LVD | 10.7V | 9.5V | 11.2V | 10.7V | 10.7V | 10.7V |

*all voltage X2 ,X4 while using 24V /48V system.

*Product specifications are subject to change without prior notice.