C4012B

for up to 12S LiPo & LiFe & LiTo
3mV voltage accuracy
1500W charge power at AC
500W charge power at DC
1.2A balance current
2.8" TFT LCD display

Thanks for your purchasing the 1500W CHARGER for your e-Vehicle or RC model.

Read the ENTIRE instruction manual to become familiar with the features/functions of the device before operating.

Feel free to send an email to jasonwang3a@163.com or call at 86 755 2643 6165 should you have any questions and suggestions.

Jason Wang

Chargery C4012B charger uses advanced Synchronous buck-boost DC/DC converter technology, high power, high current and high-performance power conversion circuit. The maximum charge power up to 40A 1500W at AC input, and 20A 500W at DC input, the maximum charge/discharge current is up to 40A. The charger can charge up to 12S LiPo, Lilo, LiTo, LiFe, with maximum 1.2A balance current, adopts unique balance circuit resume all cells voltage as fast as possible.

Safety Notes

Please read the manual completely before using, to make sure you can use this device better and more safely.

1. Keep the charger away from children and pets at all times.
2. Never leave the charger unsupervised when charging or discharging. If you leave, disconnect the battery to prevent any unexpected dangers or damage.
3. Ensure the charger program and settings match the battery pack otherwise the battery will be damaged and a dangerous situation may arise, especially for Lithium batteries which may cause a fire.
4. Don’t cover the cooling fan.
5. Do not mix batteries of different types, different capacities or from different manufacturers.
6. Never charge or discharge any battery having evidence of leaking, expansion/swelling, damaged outer cover or case, color-change or distortion.
7. Do not place the charger or any battery on a flammable surface or near a combustible material while in use. Do not charge or discharge on a carpet, cluttered workbench, paper, plastic, vinyl, leather or wood, inside an R/C model or inside a full-sized automobile.
8. Do not try to charge “non-rechargeable” dry cells.
9. Never block the air intake holes and Don't use the charger in a refrigerated or high temperature environment.
10. Do not allow water, moisture, metal wires or other conductive material into the charger.
11. Do not exceed the battery manufacturer’s suggested maximum charge and discharge rates.
12. Carefully follow the battery pack manufacturer’s recommendations and safety advice.

Copyright

Special Features

1. Unique charge architecture realized better transient response to any changes of voltage on input and output.
2. The charger use advanced ADC measurement technology, high accuracy, high voltage and high current detection circuit. The maximum voltage measurements tolerance is within 5mV at up to 12S LiPo battery.
3. The charger adopts advance balance circuit and Algorithm, constant 1.2A per cell balance current is very useful for large capacity battery pack, the feature can resume all cell voltage balance status at the shortest time.
4. Maximal 100W discharge power need not any external load.
5. Charger internal temperature protection. When the internal temperature exceeds the setup temperature, the output power is automatically decreased; and the charger will stop working when temperature exceeds the shut-down temperature.
6. TFT LCD screen provides rich information including current, voltage, power, capacity, time, working status and temperature and so on.
7. The charger features a maximal safety protection,
   - Reversed polarity protection on input and output
   - Anti-spark on input and output even connect to 50V battery.
   - Wrong battery connection protection when multi battery pack connected in series on adapter board.
   - Charge time, charge capacity and battery temperature protection.
   - Over temperature protection during charge at DC input and at AC input
   - Over temperature protection during discharge
   - Over temperature protection during balance
   - Short-circuit protection on output, safer and more reliable.
8. Supports upgrading the firmware program by USB port.
9. Active PFC: smaller AC input current less interference, and Conform to European Commission Regulation no 278/2009 and Energy Star Version 2.0
10. AC 90-265V worldwide operation: need not any alternative switcher, worldwide safe operation.
11. Low power consumption (less than 1W) when AC input and don't conduct any program
12. Up to 94% of convert efficiency when AC input and 96% when DC input.
13. As Power supply output voltage can be adjusted from 5V to 50V, and output current can be adjusted form 5A to 40A
14. 2 Intelligent cooling fans turned on upon the temperature automatically
15. ZVS/ZCS and Synchronous Rectification assure the highest efficiency.
16. High power density: 572W/Kg
17. Start at no load or full load as power supply
18. Approved by CE, conform to EMC Directive 2014/30/EU,
    a) EN 55032:2015
    b) EN 55024:2010+A1:2015
    c) EN 61000-3-2:2014,
    d) EN 61000-3-3:2013
    Conform to the LVD Directive 2014/35/EU
    e) EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
19. 12 months warranty

Environment Requirements

- Ambient Temperature : -10--45℃
- Ambient Humidity ： 5%--95%
- Storage Temp. ： -20℃--70℃
- Storage Humidity ： 30%--90%

AC Input

- Rated Voltage ： AC110 / 220V
- Voltage allowed：AC90 ~ 265V
- Rated Freq. ： 50/60Hz
- Freq. Allowed ： 47~63Hz
- Max Current ： 18A @90V, 7.5A @220V
- Efficiency: 94% at 65% load and 220Vac input.
- Active PFC: PF>0.99 at 90VAC and 100% of load; PF>0.97 at 220VAC and 100% of load

DC input

- Rated voltage: DC 10-30V, 35V max.
- Rated Current: 25A maximal

Output as power supply

- Voltage ： 5 ~ 50V programmed
- Voltage accuracy: ±1%
- Current accuracy: ±1%
- Ripple voltage: 150mV.
- Current：5 ~ 40A programmed
- Power: 1500W max.

Output as charger

1. Charge current: 0.1-20A, 500W max. at DC input, or 1-40A, 1500W max. at AC input
2. Discharge Current: 0.1-40A, 100W max.
3. Accuracy of the cell voltage: -5mV/+5mV
4. Balance current: 1.2A per cell only for LiPoly, Li-ion, LiTo and LiFePO4 battery pack
5. Battery Type: LiPoly, Li-ion, LiHV, LiTo, LiFePO4, NiMh/NiCd, Pb acid(VRLA) battery pack

	C4012B
LiPo/LiHV battery 1)	1-12S
LiTo battery	1-12S
LiFePO4 battery	1-12S
NiMH/NiCd battery 2)	1-35S
Pb battery—Lead Acid or AGM battery	1-21S (42V)

1) The terminal voltage per cell can be set up to 4.40V only for High Voltage LiPo battery. Li-ion, NMC(**LiNiMnCoO2**) battery is also supported.
2) NiMh/NiCd cell count is identified automatically

Protection as power supply

- Over voltage protection, over 2V setup value.
- Over current protection, over 2A setup value.
- Over load protection, 1500W max.
- Over temperature protection, 100℃ max.
- Short circuit protection on output.

Mechanical Characteristics

- Size：281*170*68 (L×W×H, mm) or 11.1×6.69×2.68 (L×W×H, inch)
- Weight: 3.5Kg without any accessories.
- Input power cable: AWG14 wire, 600mm length for DC; AWG14 wire 1.5m length for AC
- Output DC connector: XT-90 male connector

Packaging Content

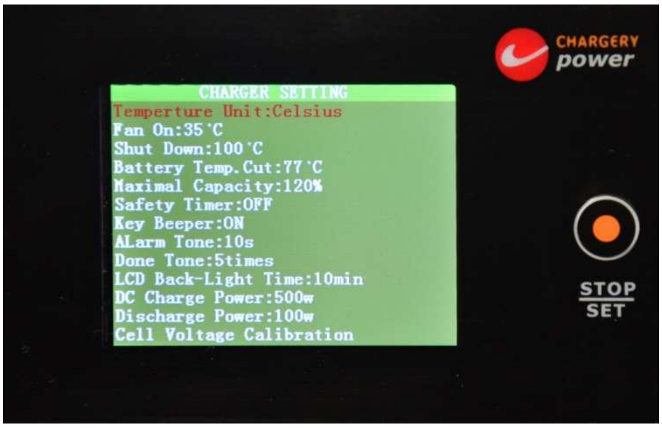
- Charger unit: 1pcs
- Power cable for DC: 1pcs, AWG14 wire, 600mm length with 4mm gold male connector
- Power cable for AC: 1pcs, AWG14 wire, 1500mm length
- USB data line: 1pcs
- Temperature sense wire: 1pcs
- adapter wire: 2pcs, connect charger to adapter board
- adapter board:2pcs
- XT-90 female conntor:1pcs

Interface

DC Input	Connect to power supply or battery, DC voltage range is 10V to 28V, absolutely 30V maximal
AC Input	Connect to AC source 90-265V 50/60Hz
USB port	Connect to PC update the firmware by Chargery UpdateTool.
Output port	Connect to battery.
Temperature sensor port	Connect to temperature sensor monitor battery temperature, the sensor must be pasted tightly battery during charge or discharge. battery temperature can affect battery life and performance seriously, the maximal temperature should not be over 40 ℃ during charge.
Balance port	Connect to adapter board or battery directly for Balance charge or Balance only.
STOP/SET	When the charger operate any program, Press STOP button terminate it. In main interface, and no any program operate, Press for 2 seconds get the cell and battery impedance.
Knob	Decrease parameter value or alternate menu item by rotate the Knob clockwise Increase parameter value or alternate menu item by rotate the Knob counterclockwise
Knob	In main interface, press Knob for 3 seconds, the unit will enter into function interface directly, press for 3 seconds will operate last program directly. In Battery Type interface, press for 3 seconds, the unit will enter into charger setting menu. In Memory Select interface, press for 3 seconds, the unit can edit memory name In function interface, press for 3 seconds, the unit will operate chosen program.

Program Setting

1. On Battery Type interface, Press Knob button for 3 seconds enter into CHARGER SETTING interface.
2. Rotate Knob button select the item, press Knob shortly make the value flash, and rotate change the value. Press knob button shortly confirm the change. After finish all setup, press knob for 3 seconds quit the setup menu.
3. When quit setup mode, the charger will save all parameters till next change.



NOTE: Please keep the default setup unless for special purpose.

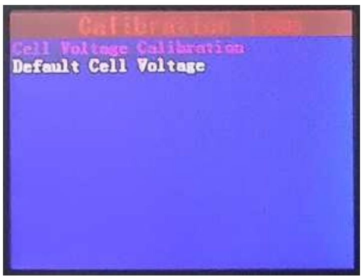
Parameters	Min.	Default	Max.	Step	unit
Temperature Unit		Celsius	Fahrenheit		
Fan ON, Fan start temperature	35	40	50	1	℃
Shut Down, the charger stop working when internal heat sink temperature reach the value	50	70	100	1	℃
Battery Temp. Cut	25	40	80	1	℃
Maximal Capacity, maximal charged capacity	10	120	200	1	%
Safety Timer, maximal charged time(1)	1	120	9999	1	min
Key Beeper		ON	OFF		
Alarm Tone	5	10	20	1	second
Done Tone(2)					
LCD Back-Light Time(3)	1	10	255	1	min
DC Charge power	10	500	500	1	W
Discharge power	5	100	100	1	W
Cell Voltage Calibration(4)					

NOTES:

1) If alternate choose OFF, the safety timer will be inactive.
2) Done tone sound have 4 mode: 30seconds, 3 min, 5times and always. Press Knob or STOP/SET turn off the sound.
3) Always will make the LCD Back-Light is ON till power off the charger
4) **Cell Voltage Calibration** is not recommended, all voltage and current is calibrated before delivery.

when need calibrate cell voltage, In Battery Type interface, please press Knob Button for 3 seconds enter into CHARGER SETTING interface, rotate Knob button select Cell Voltage Calibration and press Knob button shortly enter into calibration interface as following picture.

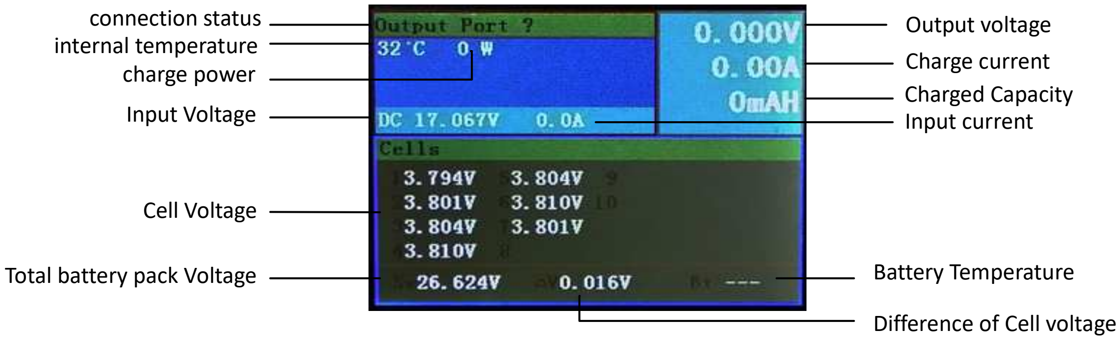
a) Choose Cell Voltage Calibration and press Knob button shortly, you will find cells voltage, press Knob and rotate modify voltage according to standard voltage, choose NEXT and press Knob button for 3 seconds save data.



b) Choose Default Cell Voltage and press Knob shortly resume all cell voltage to default value.
c) Press Knob for 3 seconds return previous interface.

Operating guideline

1. Connect the charger to power supply or battery pack with 10-30V, the unit will start and display Chargery logo, model, version and series number, 2 seconds later, main interface is displayed. As following picture.

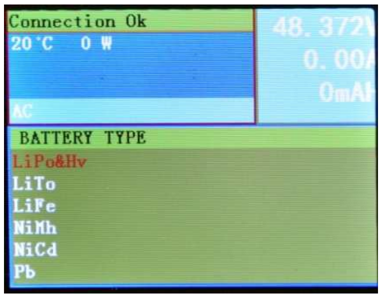


The charger can identify DC or AC source connection. If connect DC and AC source to the charger, the DC input is preferred to AC.

2. Press STOP/SET for 2 seconds get the cell and battery impedance.

Warning: for 2 or 3 batteries connected in series, please check the details on page 11 before next step operation, wrong connection will burn adapter board even short circuit the battery.

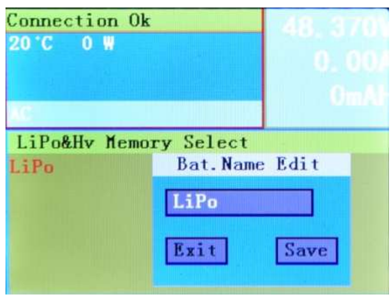
3. Connect battery positive and negative to charger output.
4. Connect to battery on Balance port
5. Press Knob shortly enter into battery type as right picture, rotate Knob alternate battery type. Press STOP/SET return last interface.



6. Press Knob shortly on any battery type display Memory Selection interface. As below right picture. Press STOP/SET return last interface.
7. Press Knob shortly on any memory name enter into function selection interface. Take LiPo battery as sample. each battery memory record all parameters include cell count, charge current, end voltage and so on, the charger is built in one memory including a set of default value before delivery, the default memory name is LiIo, LiPo, LiFe, NiMH, NiCd or Pb.

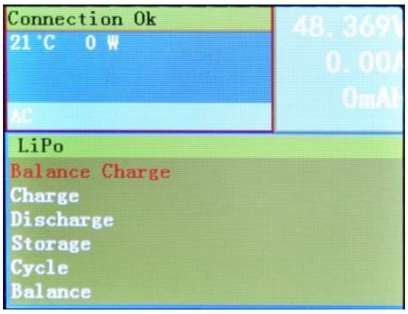
Press Knob button for 3 seconds Edit, Add or Delete recorded memory data as right picture. one memory data has a memory name and include a set of charge and discharge parameters, you can save a set of parameters for your each battery, the charger can save up to 10 set of parameters for each battery type.

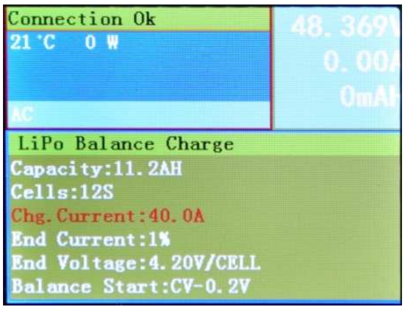
Rotate Knob alternate Edit, Add or Delete, Press Edit and rotate Knob modify saved memory name. Press Delete delete saved memory data. Press Add save new data.

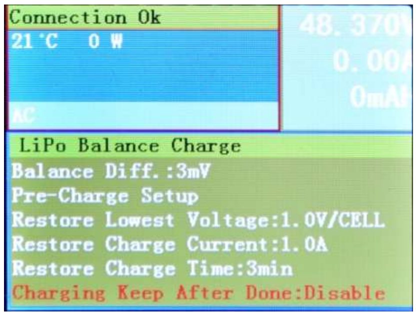


if need add new data record, first press Add and rotate Knob rename a memory name (press STOP/SET back to last name), then press Save and save it. After you choose new memory name and modify some parameters, the charger will record the latest parameters. Press Exit don't save any change. see right picture.

8. Press Knob shortly on any function, the function parameters setup interface will be displayed, Press Knob choose item and rotate Knob modify. For all lithium battery, there are Charge, Balance Charge, Discharge, Storage, Cycle and Balance functions. Take as LiPo Charge as sample. The details are as below pictures.







The details of parameters set up for **LiPo&HV, LiTo and LiFe** battery is in the following table.

Parameters		**Min.**	**Default**	**Max.**	**Step**	**unit**
Charge						
Capacity---Rated battery capacity[1]		0.1	3	100	0.1	Ah
Cells-----cell count[2]	C4012B	1	3	12	1	
Chg. Current----Charge current	DC input	0.1	5	20	0.1	A
	AC input	1	5	40	0.1	A
End Current----Charge terminal current		5	10	20	1	%
End Voltage----Charge terminal voltage per cell	LiPo&Hv[3]	3.85	4.20	4.40	0.01	V
	LiTo	1.50	2.75	2.80	0.01	V
	LiFe	3.20	3.65	3.65	0.01	V
Pre-charge Setup						
Restore Lowest Voltage per cell----any cell voltage cannot be charged to over setup, the charge will stop		0.5	1.0	2.5	0.1	V
Restore Charge Current		0.1	0.5	1	0.1	A
Restore Charge Time		1	3	5	1	min
Balance charge						
Balance Start---any cell voltage reach the value, balance function will start[4]		CV-0.0	CV-0.2	CV-1.0	0.1	V
Balance Diff--- balance stop when difference of cell voltage less than or equal to the value		3	5	10	1	mV
Discharge						
Dchg. Current---discharge current		0.1	2.0	40	0.1	A
End Current---Discharge terminal current		1	50	100	1	%
End Voltage--- Discharge terminal voltage per cell	LiPo&Hv[3]	2.50	3.00	4.10	0.01	V
	LiTo	1.50	2.00	2.50	0.01	V
	LiFe	2.00	2.50	3.40	0.01	V
Storage						
Sto. Voltage---Storage voltage per cell[5]	LiPo&Hv[3]	3.65	3.85	3.90	0.01	V
	LiTo	2.00	2.30	2.50	0.01	V
	LiFe	3.10	3.20	3.30	0.01	V
Cycle						
Cycle Mode		CHG--->DCHG		DCHG--->CHG		
Cycle Count		1	3	99	1	
Delay Time---the time between charge and discharge		0	3	999	1	min
Balance						
Balance Diff.		3	5	10	1	mV

1) **Ignore** means the charged capacity cannot be as control condition.

2) **Auto** means the charger will identify cell count automatically

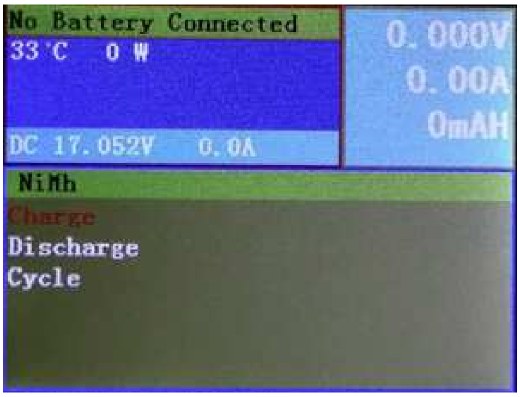
3) Charge and discharge terminal voltage is most important, if cannot confirm battery chemistry, please read battery datasheet, and then setup the voltage per cell according to battery datasheet.

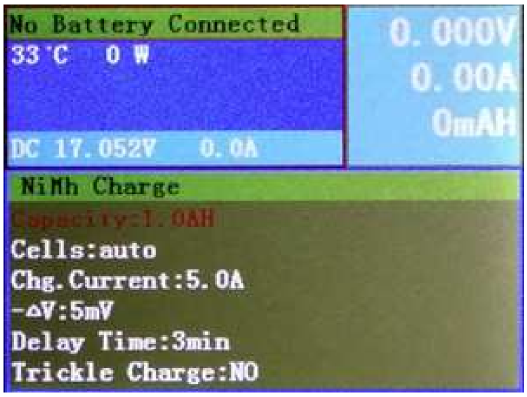
With the large demands of new energy car and storage system, many new battery chemistry system is in developing, more and more new battery positive material is applied to new lithium battery, now the popular lithium battery is NMC(LiNiMnCoO2) in China, So before charge any lithium battery, please must read battery or cell datasheet seriously, whatever any new chemistry or positive material, charge terminal voltage and maximal charge current must be described.

4) **Always** means the charger start to balance when start to charge. CV is charge terminal voltage per cell.

5) On Storage mode, the program will charge or discharge battery pack to storage voltage, the charge and discharge current will be as same as charge and discharge mode.

For **NiMh/NiCd** battery, there are Charge, Discharge and Cycle functions. As below pictures.



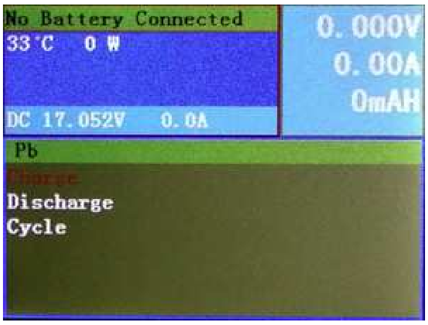


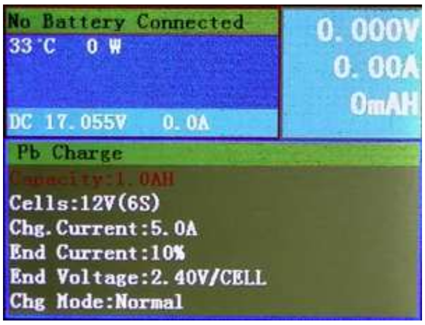
The Details of parameters set up for **NiMH/NiCd** battery is in the following table.

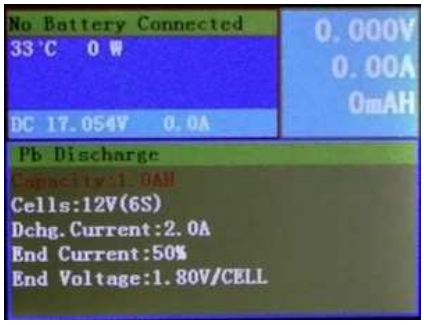
Parameters		Min.	Default	Max.	Step	unit
Charge						
Capacity---Rated battery capacity[1)]		0.1	3	100	0.1	Ah
Cells-----cell count	C4012B		Auto			
Chg. Current----Charge current	DC input	0.1	5	20	0.1	A
	AC input	1	5	40	0.1	A
-ΔV		5	5	20	1	mV
Delay Time---Battery Voltage restore time		0	3	20	1	min
Trickle Charge			NO	YES		
Trickle Current		0.1	0.5	1	0.1	A
Trickle Time		1	5	999		min
Charge Mode			Normal			
Discharge						
Dchg. Current---discharge current		0.1	2.0	40	0.1	A
End Current---Discharge terminal current		1	50	100	1	%
End Voltage--- Discharge terminal voltage	C4012B	0.7	0.7	20	0.01	V
Cycle						
Cycle Mode		CHG-→DCHG		DCHG-→CHG		
Cycle Count		1	3	99	1	
Delay Time---the time between charge and discharge		0	3	999	1	min

1) **Ignore** means the charged capacity cannot be as control condition.

For **Pb acid battery (VRLA)**battery, there are Charge, Discharge and Cycle functions. As below pictures.







The details of parameters set up for **Pb acid battery (VRLA)** is in the following table.

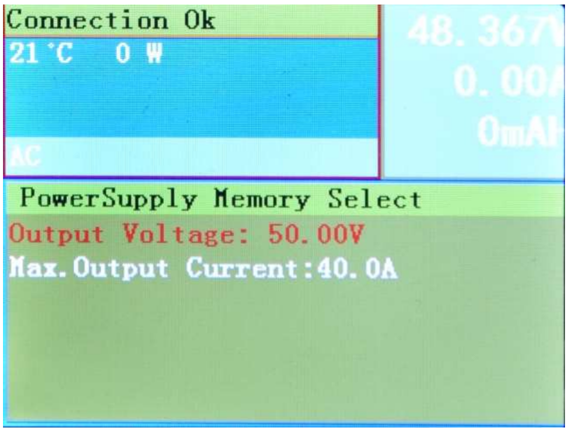
Parameters		**Min.**	**Default**	**Max.**	**Step**	**unit**
Charge						
Capacity---Rated battery capacity[1)]		0.1	3	100	0.1	Ah
Cells-----cell count	C4012B	1	6S(12V)	21		
Chg. Current----Charge current	DC input	0.1	5	20	0.1	A
	AC input	1	5	40	0.1	A
End Current----Charge terminal current		1	10	50	1	%
End Voltage----Charge terminal voltage per cell		2.00	2.40	2.50	0.01	V
Charge Mode			Normal			
Pre-charge Setup						
Restore Lowest Voltage per cell----any cell voltage cannot be charged to over setup, the charge will stop		0.5	1.0	2.5	0.1	V
Restore Charge Current		0.1	0.5	1	0.1	A
Restore Charge Time		1	3	5	1	min
Discharge						
Dchg. Current---discharge current		0.1	2.0	40	0.1	A
End Current---Discharge terminal current		1	50	100	1	%
End Voltage--- Discharge terminal voltage per cell		1.50	1.80	2.40	0.01	V
Cycle						
Cycle Mode		CHG-→DCHG		DCHG-→CHG		
Cycle Count		1	3	99	1	
Delay Time---the time between charge and discharge		0	3	999	1	min

1) **Ignore** means the charged capacity cannot be as control condition.

9. Finish all parameters setup, press Knob for 3 seconds, pop up a window, press YES start to operate program.
10. Press STOP/SET stop any program and return to program operating interface.

As power supply

When connect the charger to AC source, on Battery type interface, choose power supply setup output voltage and maximal output current, the charger will work as a programmed power supply; you can set up the output voltage and maximal output current, and then press Knob for 3 seconds power on the charger.



- Output voltage adjustment range: 5V~50V,
- Output current adjustment range: 5A~40A.

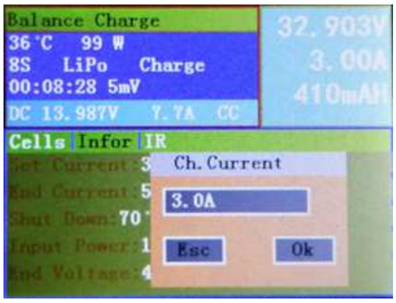
Error or Warning

When any mistakes triggered, the charger will stop working, and display error information, press Knob return main interface.

Such as if the battery connection bread down, the battery connection error will be displayed on the top line. If the battery temperature over the setup value, "Over Temperature" will be displayed, as so on.

Tips

1. **In main interface, press for 3 seconds, the charger will enter into function interface directly, press for 3 seconds will operate last program directly.**

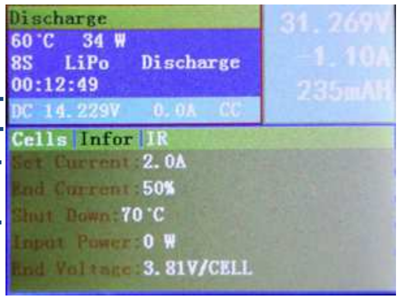


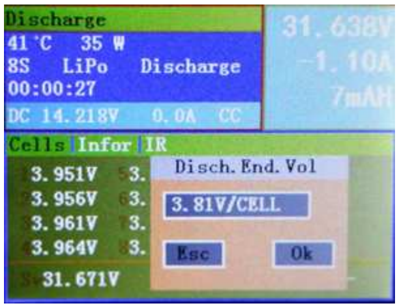
2. During charge in CC phase, the charge current can be set up to new value and need not stop charging. On Cells and Info page, press Knob button for 3 seconds, Ch. Current modification window is pop up, please press Knob and rotate Knob button modify charge current, press **Esc** quit and press **Ok** save the change. The charger will charge at new current.

   And rotate Knob to alternate Cells, Info and IR label page, on Info page, you will check some preset parameters and actual input power.

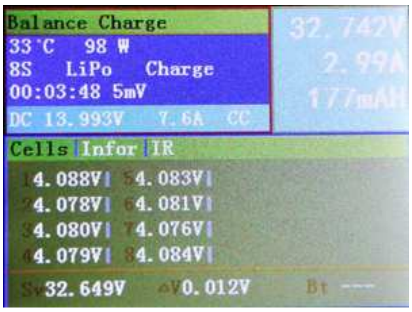
   On IR page, you can check each cell impedance and total battery impedance

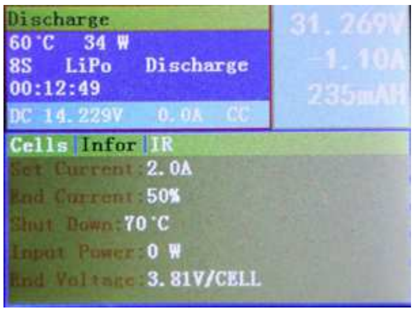
Original Charge current
charge terminal current
Shut down Temperature
Input power
Charge terminal voltage/cell

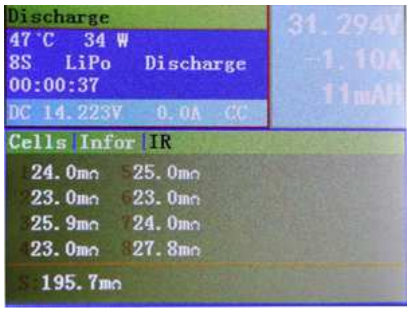




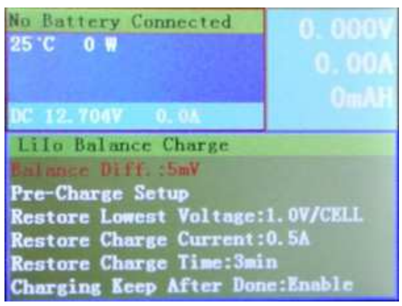
3. During discharge, the discharge terminal voltage can be changed and need not stop discharging, On Cells and Info page, press Knob button for 3 seconds, Disch. End.Voltage modification window is pop up, please press Knob and rotate Knob button modify end voltage per cell, press Esc quit and press Ok save the change. The charger will continue to discharge and stop at new terminal voltage.







4. On LiTo, LiPo&Hv and LiFe battery balance charge program, Enable “Charging Keep After Done”, continue to charge at smaller current when charging is done. Disable the function, will stop really charging.

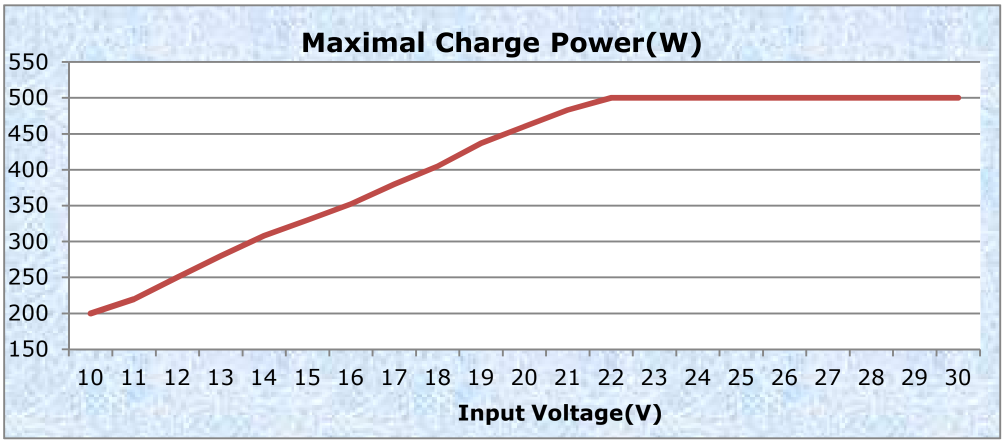


Firmware Upgrades via USB Port

1. Go to http://www.chargery.com/uploadFiles/ChargeryupdateTool.zip to download the ChargeryupdateTool.zip, the zip file include Chargery USB driver, and Chargery Update Tool, extract to any disk on the PC.

2. To install the USB driver, run the program X:\ChargeryupdateTool\ChargeryUSBdriver.exe (where X is the drive letter designator for your CD-ROM drive.)
3. In the same directory, double click to run the update tool and enter program interface.
4. Connect the charger to the PC by the USB data cable. When the port number (such as com5) appears, this shows the update tool identified the charge. Click OPEN button lock the port please.
5. Click Open file button open the firmware file. If there is no firmware file on the PC, you can download the file on http://www.chargery.com/uploadFiles/firmwareFiles/ to your PC.
6. Click the Update button, then the update progress bar will appear on the bottom, update complete will be displayed on PC. The charger display the progress bar simultaneously and restart the charger after finish update.

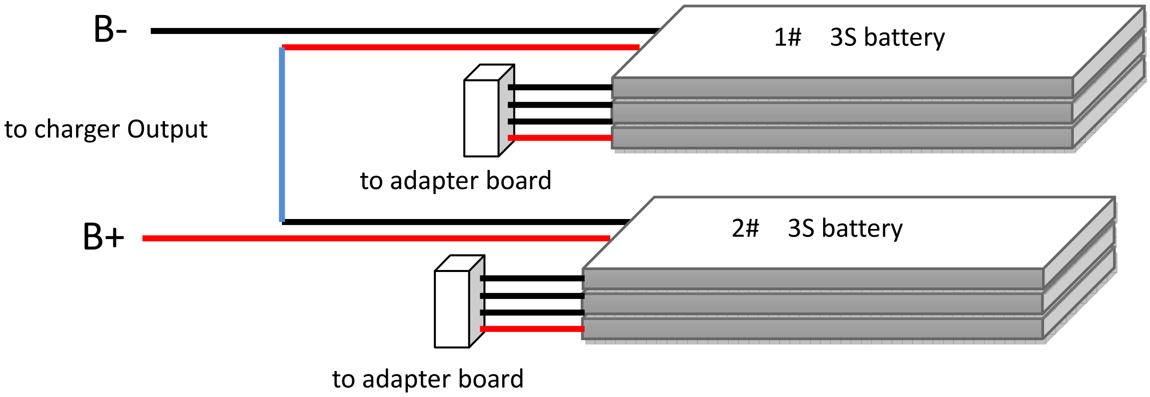
Maximal Charge Power VS DC Input Voltage



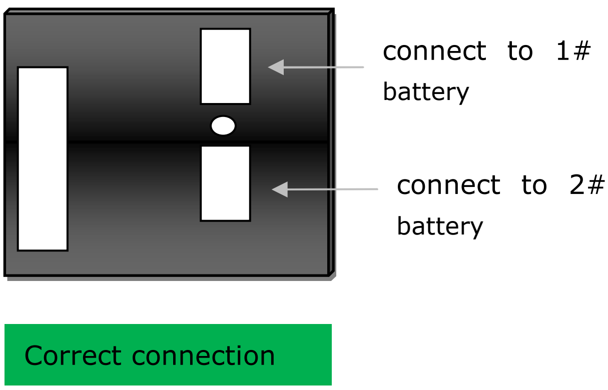
Typical Connection

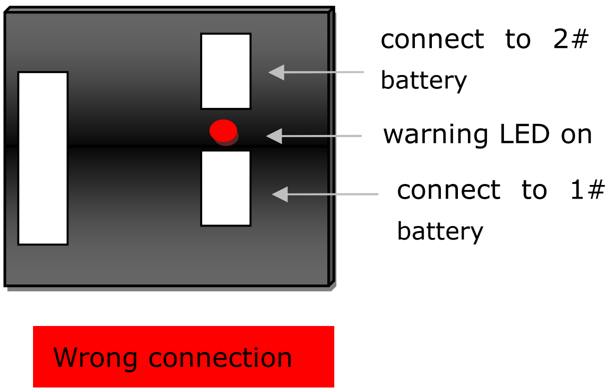
The charger have two balance port for 2S-6S and 7-12S separately, each balance port can connect to 2S-6S battery, if you have one battery pack under 6S such as 2S, 3S, 4S, 5S, you can connect the battery to balance port by adapter board, if you have two battery but total cell count is under 6S such as 3S+3S, 2S+2S, The connection is as below, two 3S packs will be charged as one 6S pack.

1. Connect two packs with heavy wire in series (as same as the Blue wire in following picture). Take two 3S battery as sample.

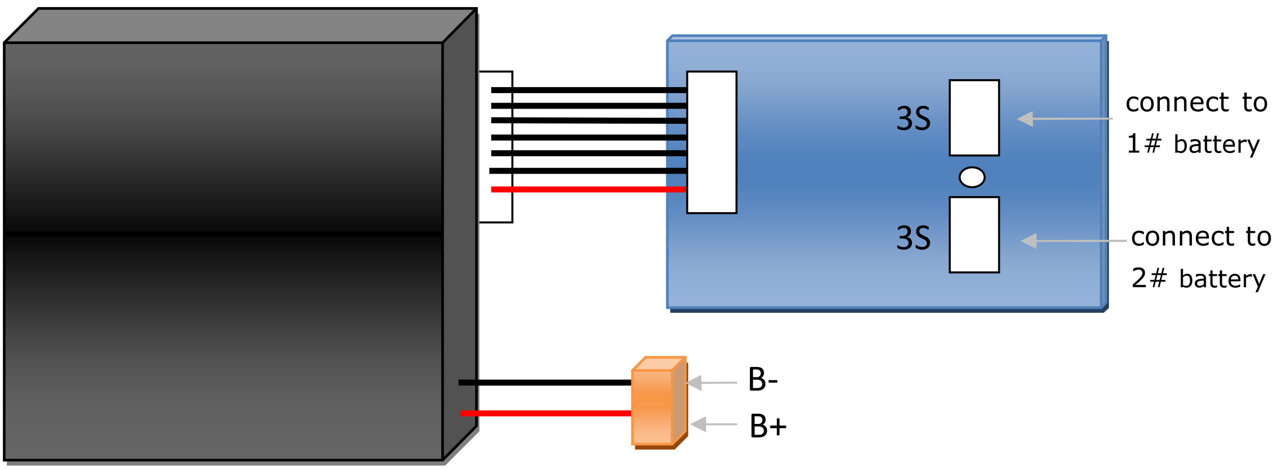


2. Plug 1# battery and 2# battery into adapter board, if plug into mistaken socket, the red LED will be on, please exchange the connector and plug it again.



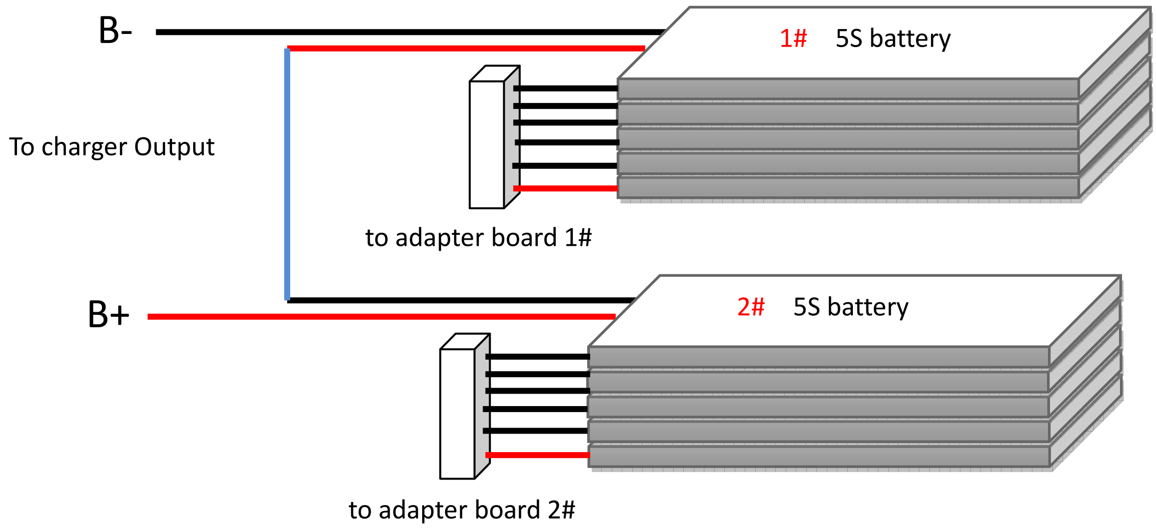


3. Connect total battery pack positive to charger output port B+, and connect battery negative to output port B-, finally connect adapter wire to charger balance port.

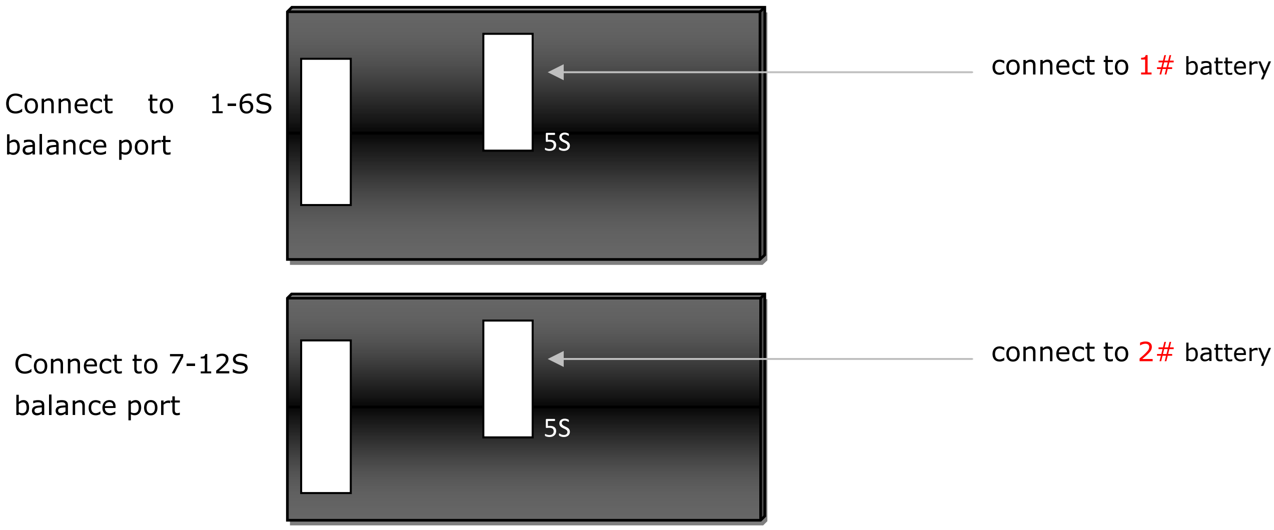


If you have two batteries and total cell count is over 6S such as 5S+5S, 4S+4S, 6S+6S, 5S+3S, 3S+6S, and so on The connection is as below, two 5S packs will be charged as one 10S pack. For 6S+6S, if battery connector is XH type, you can connect the battery to balance port directly and need not adapter wire and adapter board.

1. Connect two or three packs with heavy wire (as same as the Blue wire in following picture). Take two 5S battery as sample.



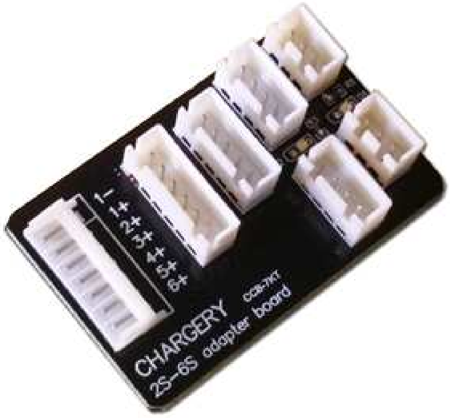
2. Plug 1# battery and 2# battery into two adapter board separately, .



3. Connect total battery pack positive to charger output port B+, and connect battery negative to output port B-, finally connect adapter wire to charger balance port.

Important thing is 1# battery must be connected to 1-6S balance port. Otherwise the charger will be damaged.

Accessory

AC Input wire, 1500mm	**DC Input wire, 600mm**
	
Adapter wire: connect adapter board to balance port on C4012B	**Adapter board:CCB-7KT for 6S battery**
	
Temperature sensor	**USB data line**
	

Related parts

The following device is related with 500W CHARGER

MODEL	**DESCRIPTION**	**COMMENTS**
5006B	1-6S Li-Ion/LiPo/LiFe battery, 1.3A balance current	
5008B	1-8S Li-Ion/LiPo/LiFe battery, 1.3A balance current	
50010B	1-10S Li-Ion/LiPo/LiFe battery, 1.3A balance current	
S600plus	600W power supply specially for 500W charger	DC5-26V, 25A 600W output

Version History

Version	Description
V1.16	First released
V1.20	Fix a bug pop up error when unbalanced at the end of charge
V1.21	Fix a bug pre-charge on LTO battery
V1.24	Fix a bug on balance charge mode
V1.25	Add LCD contrast adjustment
V1.26	Optimize back ground and text color
V1.27	Add serial number check on charger setting

Warranty and Servicer

Chargery Power Co., Ltd. as manufacture of 1500W/500W CHARGER to be free of defects in material and workmanship. This warranty is effective for 12 months from date of purchase. If within the warranty period the customer is not satisfied with the products performance resulting from a manufacturing defect, the accessory will be replaced or repaired.

Your selling dealer is your first point of contact for warranty issues. Return postage costs are the responsibility of the user in all cases. Please submit copy of original receipt with the return.

Damage due to physical shock (dropping on the floor, etc.), inappropriate power supply (unstable output voltage and insufficient power, etc.), water, moisture, and humidity are specifically NOT covered by warranty.

CHARGERY power
Charging Expert

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