C6050A, C6050B v2.0

PFC programmable charger
High efficiency wide input voltage
90V~265VAC Input
For 4S~14S LiPo/LiFe battery
1~55Amps 3050W max.

Thanks for your purchasing the intelligent and powerful charger.

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

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Features

The Battery Charger has been designed to provide reliable, quality charging for battery systems in electric drive vehicles. It is a high efficiency wide input voltage charger, the charger can output 3000W at AC90V~265V in a smaller size. Many creative technology help to realize up to 94% of efficiency, and the internal temperature is still under 50℃. The following are some new features:

- Remote Control charge current and charge automatically special for Photovoltaic System.

- Intelligent control output voltage and current by microprocessor, 100% calibration before delivery

- ±1% voltage and current accuracy

- **Active PFC**: smaller AC input current less interference, and Conform to European Commission Regulation no 278/2009 and Energy Star Version 2.0

- AC **90-265V** worldwide operation: need not any alternative switcher, worldwide safe operation.

- Low power consumption (**less than 1W**) at idle mode and standby mode

- Up to **94%** of convert efficiency.

- Programmable output voltage from **12V** to 55V

- Programmable output current from **1A** to 55A

- **TFT color LCD** display output Voltage, current, power and internal temperature on time.

- Over current, over voltage, over load, over temperature, and short circuit protection

- Short-circuit protection on output, safer and more reliable.

- 2 Intelligent cooling fans turned on and adjust speed upon the temperature automatically

- High power density: 698W/Kg

- Start at no load or full load

- Approved by CE

- 24 months warranty

Application

- Home application

- Electric drive vehicles

- Photovoltaic System

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Protection functions

1. Over current protection
2. Over voltage protection
3. Charge power protection
4. Over temperature protection
5. Anti spark on battery connection
6. Reverse polarity protection of battery connection
7. Prevent any cell from over charging, adjust charge current automatically fit with Chargery BMS

Main battery type and cell count

| Battery Type	Cell Count	Output Voltage/V	Terminal charge Voltage per cell			Charge current	Terminal charge current/A	Charge Mode
			Min.	Type	Max.			
LiPo	4S-13S	10-55	2.75	4.20	4.20	1.0-55A	5-60%	Pre-charge CC/CV and maintain
Li-ion	4S-13S	10-55	2.50	4.10	4.15			
LiFe	5S-14S	10-55	2.00	3.65	3.75			
LiTo	7S-20S	10-55	1.50	2.70	2.70			
Pb	6S-22S	10-55	1.75	2.40	2.45			
			- delta Voltage /mV					
			Min.	type	Max.			
NiMH /NiCd	Auto	10-55	150	300	1000			CC

 # Warning

1. For any lithium battery, such as LiPo, LiFePO4, Li-ion, NMC, LiTo and other Li battery, the PCM (Protection Circuit Module), BMS, cell monitor, saver etc. must be built-in the battery pack, because the charger don't monitor each cell voltage, even the total battery voltage don't be over charged, the single cell voltage is possible be over charged, special for larger impedance cell. So if no PCM or BMS protect each cell from over charged, it is very dangerous.

2. Before charge, the cell count must be setup correctly, it is very important. Cell count is not the cell quantity in a battery pack, it means cell count of connection in series, even 5 cells connected in parallel, the cell count is 1 NOT 5. Please according to your battery pack rated voltage and the following table get the cell count.

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3. Please connect the charger to AC power source carefully. There two sockets on the C6050 charger, one is normal 3pin socket, another is large current terminal blocks.

The important is the socket and block is connected in parallel inside of C6050, as below.

Terminal block   3PIN socket
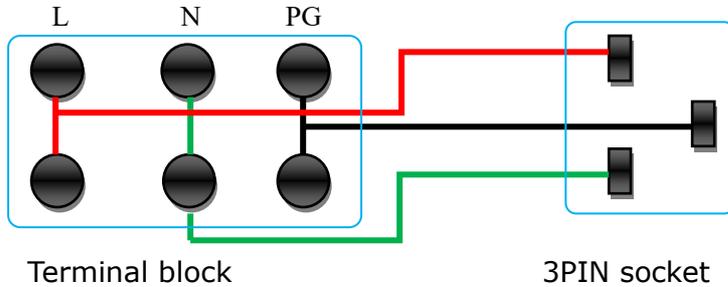
So when connect block to AC source, please note L, N and PG wire must be connected in parallel on AC source.

When connect to AC220V, the normal 3pin socket is ok, the socket can bear 15Arms maximal and output 3000W.

When connect to AC120V and output over 1500W, please connect to large current terminal blocks by 12AWG heavy wire at least.

Cell count/Battery rated voltage	LiPo,V	Li-ion,V	LiFePO4,V	LiTo,V	Pb/VRLA/Gem battery,V
4	15.4	15.0			
5	19.3	18.8	16.0		
6	23.1	22.5	19.2		12.0
7	27.0	26.3	22.4	16.8	14.0
8	30.8	30.0	25.6	19.2	16.0
9	34.7	33.8	28.8	21.6	18.0
10	38.5	37.5	32.0	24.0	20.0
11	42.4	41.3	35.2	26.4	22.0
12	46.2	45.0	38.4	28.8	24.0
13	50.1	48.8	41.6	31.2	26.0
14			44.8	33.6	28.0
15				36.0	30.0
16				38.4	32.0
17				40.8	34.0
18				43.2	36.0
19				45.6	38.0
20				48.0	40.0
21					42.0
22					44.0

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Normal Charge Operation Instructions

1. Connect C6050 to AC 110 / 220V outlet by the special heavy power cable, if use other brand cable, please note the wire AWG must be AWG14 at least.

2. Connect battery to charger.

3. Connect Chargery BMS24T to charger if possible.

4. 2 seconds later, the idle interface is displayed; the charger is ready to charge. Actual output voltage, current and internal temperature is also displayed, but C6050 is at idle mode (no output) to save power consumption.
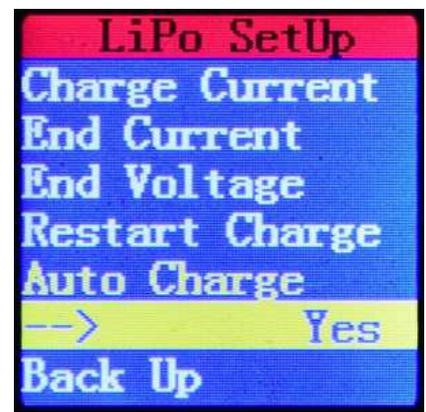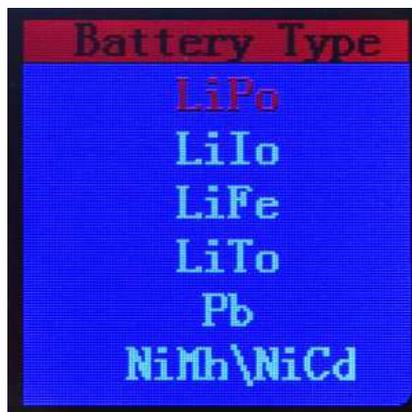
5. Press knob shortly can choose Battery type; press again on Battery type such as LiPo can enter into LiPo charge setup interface. Here, you can setup cell count, charge current, charge terminal current, and charge terminal voltage per cell, and then press knob for 3 seconds start charging.

6. Stop charging, the battery voltage will goes down because of self-discharge, if need maintain battery voltage, please setup the **Restart Charge** YES (only for C6050B), the charger will continue to charge when battery voltage goes down to 5% of total battery voltage.

   If set up to YES, the charger display KEEP after charge finished.

   If set up to NO, the charger display DONE after charge finished.

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7. **Setup the charger work at Auto mode (only for C6050B)**,

Finish all charge settings, set up **Auto Charge is YES** and press Knob for 3 seconds, the charger will start to charge, and work at Auto mode next time till disable it.

When the charger work at Auto mode, what you need to do is connect the AC power source and battery to the charger. The charger will operate at last settings.

On Auto interface, press Knob for 3 seconds alternate to Idle mode.

If need not charge as last settings, pleaser set up Auto Charge is NO

8. During charge, many charge information is displayed as below

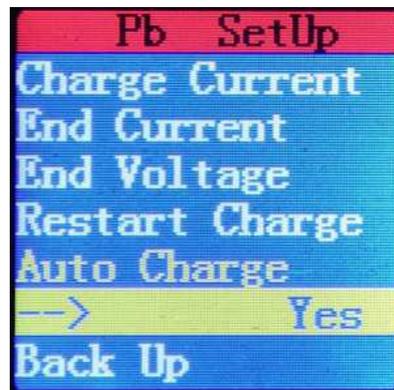Cell count, Battery Type, Charge status
Battery voltage
Charge current
Capacity charged
Charge time
Internal temperature

9. Similar with LiPo charge setup, you can setup LiIo, LiFe, LiTo, Pb battery and NiMH/NiCd.

10. At any time Press knob shortly stop charging. The charger will work at idle mode to save power consumption. Generally you needn't disconnect it from AC outlet, because it only consume under 1W power at idle mode.

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Tips

- All parameters will be remembered by the C6050 till next change.

- Choose battery type, and press knob for 3 seconds start to charge at last setup.

Auto mode operation instructions

When you need charge same one battery repeat, you can set up Auto Charge is yes on first charge (Only for C6050B), the charger will charge automatically next time, need not setup any parameters. At AUTO charge, press Knob button shortly can stop charging at any time, and press it again start to charge. Or during charge, disconnect battery stop charging, and connect it, start to charge again.

When need to charge new battery at different parameters, disconnect battery, at AUTO interface, press Knob button for 3 seconds alternate idle interface, the charger will work at intelligent operate mode, all parameters can setup in this mode.

for more details of auto mode, Please down load the video on http://www.chargery.com/Video/C10325_Automode.mp4 . For C6050B charger, the operating process is as same as with C10325.

C6050A, C6050B v2.0

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Remote control charge Mode

COM1: connect to Chargery BMS, the charge current will be controlled by BMS when any cell voltage reach OVP.

COM2: connect to external device. The charge current can be controlled by remote signal. The signal should be 1KHz 5V or 3.3V square wave.

Note:

1. To realize remote control charge by external device, please purchase C6050A.

2. If don't connect external device, the charger can be operated by manual, if connect the external device on COM2, and send a suitable signal, after press Knob for 3 seconds start to charge, the charge current will be adjusted according to external signal. External signal can turn off charge (charge current is zero, the charge status display KEEP), and control charge current at range 1A to 55A.

 # Warning

PWM signal adjust charge current, increase or decrease 10% maximal each time per one second.

C6050A, C6050B v2.0
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1~55Amps 3050W max.

Remote control operation instructions

1. Connect to AC source, turn on the charger

2. After LCD initialize, the C6050 enter into idle model

3. Connect battery to the charger. The battery voltage will be displayed, but it is not accurate, because the charger can protect the battery from reverse polarity connection and anti spark.

4. Connect the external device to the C6050, the EHR-2p wire is included with the charger.

5. Press Knob enter into battery type interface, alternate battery type and press Knob, enter into charge setup interface,

   a) Set up cell count,

   b) Set up charge current, it should be the maximal current that the battery can be charged, when PWM failed, the charger will charge at this current.

   c) Set up end current, when the charge current under setup at CV, stop charging and the battery fully charged, display KEEP charge status. The end current is a percentage (1-60%) of setup current on last step. Such as the maximal current is 10A, end current is setup to 10%, the end current is 1A.

   d) Set up end voltage, the voltage is cell voltage, it must be under or same as OVP on BMS. C6050 will charge at CV when total battery voltage reach cell count*setup value.

   e) On the charge mode, need not setup restart voltage.

8. Press Knob for 3 seconds, the charger will start to charge, the charge current will be modified according to the Duty cycle of PWM from external device. The higher Duty cycle, the higher current. The current range is 1A-55A.

9. Finish charge, the beeper sounds 10 times, charge current is zero, and display KEEP status. If need to continue to charge, adjust duty cycle to under 3% then increase gradually to adjust charge current.

10. During charge, press Knob stop charging at any time.

Please watch the operation video on https://youtu.be/KDD-QWLkFQc

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CHARGERY

Program Setup

1. In charger idle interface, press **knob** button for 2 seconds enter into Program Setup menu.

2. LCD display the following information in sequence and you can modify its value. When you want to alter a parameter value, press the **knob** button make the value blink then modify the value by rotate the button. The new value will be confirmed and saved by pressing the button again. Press **knob** buttons alternate different items, and press **knob** to quit the setup menu.

Picture 3 **Program setup**

Max current ---> 55A	Setup the maximal charge current on power supply mode, range from 1A~55A, step 0.1A, default 55A. It is only active for power supply.
Fan ON Temp. ---> 40℃	Setup the fan starting temperature, range from 30~50℃, step 1℃, default 35℃. The fan speed will increase with the temperature go
Shut Down Temp. ---> 80℃	Setup over temperature protection, range from 70~90℃, step 1℃, default 90℃. Over the temperature, the charger will power off
Buzzer ---> ON	The beeper sounds for each button press to confirm your action. These sounds can be ON or OFF. Default ON.
BACK-LIGHT TIME ---> 5MIN	This menu sets the back-light time of LCD screen backlight. Options: **1MIN, 5MIN, 10MIN, 20MIN and Always on, default 5MIN.** At default 5min, LCD back-light will be off to save the power, **press knob resume the back-light.**
Temp. Unit ---> ℃	Setup the Temperature unit, ℃ or ℉, default ℃.
C6050A or B V2.0	Software Version

Note:

■ All parameters will be remembered by the C6050 till next change.

C6050A, C6050B v2.0

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As power supply

On Battery type interface, choose "power supply" , 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: 12V~55V,
- Output current adjustment range: 1A~55A.

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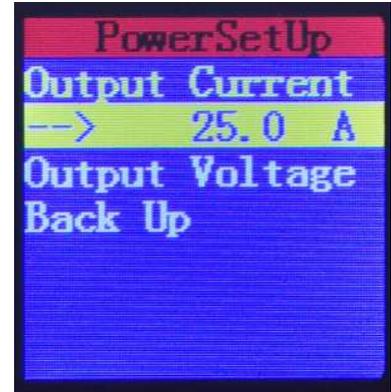
Environment Requirements

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

Input

- Rated Voltage ： AC110 / 220V
- Voltage allowed：AC90 ~ 265V
- Rated Freq. ： 50/60Hz
- Freq. Allowed ： 47~63Hz
- Max Current ： 30A @90V, 15A @220V
- Efficiency: 94% at 85% load and 220Vac input.
- Active PFC: PF>0.99 at 90VAC and 100% of load; PF>0.97 at 220VAC and 100% of load

Output

- Voltage ： 12V ~ 55V programmed
- Voltage accuracy: ±1%
- Current accuracy: ±1%
- Ripple voltage: 150mV.
- Charge Current：1 ~ 55A programmed
- Power: 3050W max.

Protection

- Over voltage protection, over 2V setup value.
- Over current protection, over 2A setup value.
- Over charge power protection, 3050W max.
- Over temperature protection, 90℃ max.
- Short- circuit protection on output.
- Anti spark when connect battery to charger
- Reverse polarity protection of battery connection
- Prevent any cell from over charging, adjust charge current automatically fit with Chargery BMS

Mechanical Characteristics

- Size：268*147*127 (L*W*H, mm) or 10.55 * 5.8 * 5.0 (L*W*H, inch)
- Weight: **4.3**Kg without input cable
- Input power cable: AWG14 wire, 1.5m length at 220Vac, AWG12 wire is suggested at 110Vac.
- Output DC connector: XT-90 male connector

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Packaging Information

- C6050 base unit: 1pcs
- Power cable: 1pcs
- Communication wire: black, 1pcs
- XT-90 female conntor:1pcs,
- EHR-2P wire: 1pcs, only for C6050A.

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Total solution (C6050A and C6050B) on E-Vehicle application

Chargery BMS is a successful combination with the charger. When all cell voltage reach setup value, the BMS will communicate with the charger, the charger will continue to charge at a smaller current rather than stopping charging.

It is very important at large current charge application. Because Start and Stop charge repeat by Close or Open relay or MOSFET, NOT only cause battery voltage fluctuation at a large range, shorten mechanical switch or electronic switch life, but also extend charging time notably.

Chargery BMS and charger as a total solution can charge and monitor each cell voltage, temperature, charge and discharge current, short circuit even cell voltage difference, and charge each cell to any voltage you want, such as you can set up the charge terminal voltage 3.85V per LiPo cell, when charge is done, the battery pack will be storage at safe status.

NOTE

Chargery charger decrease charge current according to "Over Charge Protection (P) Voltage" on BMS setup, so please setup the charge terminal voltage in accordance with Over Charge Protection (P) Voltage on BMS.

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Error Information

When the following error events trigged, the beeper will sound for 10 seconds and error information will be displayed, you can press **knob** **button** turn off beeper sound and back up to Idle or auto mode interface.

Error information	DESCRIPTION
Battery Vol. low	No battery connection or reverse polarity of battery connection or short circuit on output, the charger will be power off
Battery Vol. High	Battery voltage over setup, the charger will be power off
Over Current	Output current over 2A of setup for 2 seconds, C6050 turn off automatically and turn on manually
Over Voltage	Output voltage over 2V of setup for 2 seconds, C6050 turn off automatically and turn on manually
Over temperature	The heat sink temperature over setup for 2 seconds, C6050 power off automatically, and turn on manually
Connection Break	At normal charge, disconnect battery, the charger will stop charging, press Knob back up to idle interface

Warnings

■ Never leave the charger unattended when it power on. If any malfunction is observed, please press Knob button power off the charger as fast as possible.

■ Keep away the charger from dust, damp, rain, heat direct sunshine and vibration. Do not drop it.

■ The charger should be set up on non-inflammable and non-conductive surface. Never place on a car seat, carpet or similar.

■ Keep all the inflammable volatile materials well away from operating area.

■ Do not attempt to charge any Lithium battery not built-in BMS, PCM, cell voltage monitor

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Related parts

The following parts are similar to the C6050 and maybe of interest:

MODEL	DESCRIPTION	COMMENTS
BMS16T	2-16S battery management system	
BMS24T	2-24S battery management system	
S400	High efficiency wide input voltage PFC power supply	6~15V 25A 400W output
S600	High efficiency wide input voltage PFC power supply	10~18V 33A 600W output
S1200	High efficiency wide input voltage PFC power supply	12~24V 50A 1200W output
S1500	High efficiency wide input voltage PFC power supply	10~30V 60A 1500W output
C10325	High efficiency wide input voltage PFC charger	10~103V 25A 1500W output

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Application Notes.

Storage Energy System

If C6050 charger applied to large capacity energy System such as PV system, C6050A is suggested, the charge current can be controlled by remote device. The C6050A can receive PWM signal and adjust charge current.

- The current range is 1A to 55A.
- When PWM duty cycle under 10%, C6050 will stop charging.
- When PWM signal fail, the charger will charge at the current setup by manual.

E-car or other E- Vehicle

When C6050 applied to E-car or other E- Vehicle battery, C6050B is suggested, and Auto charge mode is the best, after setup all charge parameters on first charge and setup Auto Charge YES, the charger can charge the battery automatically next time. Need not any operation besides connect AC power source and battery to the charger.

RC or UAV

When C6050 need charge multiply chemistry battery, C6050B is suggested, on normal work mode, the charger is easy to set up for all kinds of battery. It is enough flexible to meet almost challenge.

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Version history

Version	
V2.0	First released

Order information

Function Description	MODEL	
	C6050A	C6050B
1. **Remote control** charge current by external device.	√	
2. Start to charge automatically (**Auto charge mode**) after connect to AC source and battery to charger		√
3. **Restart charge** when battery voltage drop 5-10%		√
4. **Normal charge mode,** Setup battery type, cell count and all charge parameters	√	√
5. **Power supply mode,** 12-55V adjusted, 1-55A adjusted	√	√
6. **BMS control charge,** Charge current controlled by Chargery BMS, prevent any cell voltage from over charged	√	√

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Warranty and Service

Chargery Power Co., Ltd. as manufacture of R/C, E-Vehicle and UAV power warrants C6050 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. This warranty does not cover the damage due to wear, misuse, incompetent handling or using of incorrect accessories.

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