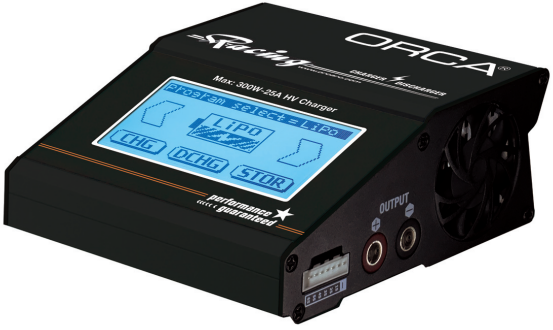
ORCA®

CHARGER DISCHARGER



Touch screen fast charger / discharger

Instruction manual

www.orcarc.com

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INTRODUTION

These operating instructions are designed to ensure that you quickly become familiar with its functions. It is therefore important that you read right through the Operating instructions, Warning and Safety Notes before you attempt to use your new charger for the first time.

ORCA charger integrates battery technology together with touch-operated system. It is equipped with a 128*64 pixel resistive touch screen, which plays very important role in the entire system. Every operating procedure and status change can be shown on this screen, making the operating procedures very intuitive. When the battery is working, you can directly check the battery capacity, battery voltage, charging time and internal resistance on the screen. Additionally, the entire charging procedures can be recorded and generated into a charging curve for you to check on the screen.

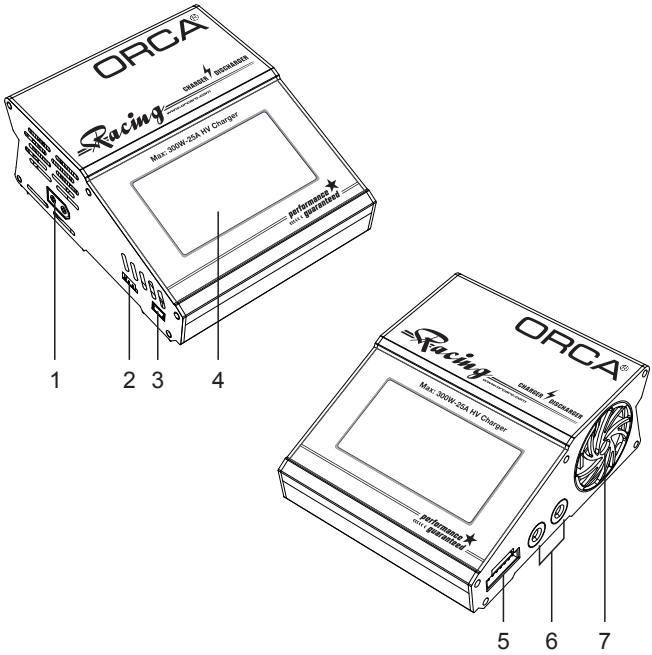
ORCA charger comes with a memory module. Users can edit and save parameters of different batteries. Once the battery parameters are edited, the shortcut for parameters will be generated on the screen, which provides a simple on-click interface for users.

ORCA charger can be powered up with 12V car battery or 11-32V output power supply, suitable for use with LiPo / LiFe / LiHV / Li-Ion / NiMH / NiCd / Pb battery, maximum 25A charge current and maximum 300W charge power. Integrated high-performance micro processor and high-efficient cooling system,control the charger always under a safety temperature situation.

Please BE SURE to read these INSTRUCTIONS, WARNING and SAFETY NOTES before you use the charger for the first time

It can be dangerous to mishandle batteries and battery chargers, as there is always a risk of batteries catching fire and exploding.

Please read this entire operating manual completely and attentively before using this product, as it covers a wide range of information on operating and safety. Or please do use this product in company with a specialist.



1.DC Input:11-32V (XT60Interface)

2.Temperature Sensor Port

3.Micro-USB port for firmware upgrade

4.Touch screen

5.1-6 cells balance socket

6.Main Output

7.cooling fan

SPECIFICATIONS

- DC Input Voltage: 11-32V
- Display Type: LCD resistive touch screen
- Control: Touch system
- Cooling system: 2 cooling fan
- Backlight: Blue
- Weight: 450g
- Dimension: 120*102*46mm
- Safety timer: 1-720min or turn off
- Charge current: 0.1A-25.0A
- Discharge current: 0.1A-5.0A
- Balance tolerance: ±0.01V
- Discharge power: max.30W
- Regenerative discharge power:max.300W
- Regenerative discharge current:0.1-25.0A
- Charge power:max.300W

- Memory: 20 different charge/discharge profiles

- External port: 1-8S Balance Socket-XH, Temperature probe socket, Battery Socket XT90, 5V/1.0A USB port, Micro USB for PC.

- Battery Types/cells: LiPo/Lilon/LiFe/LiHV:1-6S
  NiMH/NiCd:1-15cells
  Pb:2-24V

- Charge Voltage: LiPo:4.18-4.22V/cell Lilon:4.18-4.20V/cell
  LiFe:3.68-3.80V/cell LiHV:4.30-4.40V/cell

- Discharge cut-off voltage: NiMH/NiCd:0.1-1.1V/cell
  LiPo:3.0-3.3V/cell Lilon:2.9-3.2V/cell
  LiFe:2.6-2.9V/cell LiHV:3.1-3.4V/cell
  Pb:1.8V

Touch System

With the graphic touch controlled interface,the resistive touch LCD screen intuitively displays every charging status & information,which makes the operating procedures very easy.Users can enjoy a more convenient and comfortable "touch" experience.

Optimized Operating Software

ORCA charger simplifies and optimizes the operating procedures for users, it can maximumly protect your battery safety, and prolong the lifetime of the battery effectively; what's more, the charger allows users to self-define the charging parameters, so that you can configure other charging parameters according to your own requirements.

Charging Status Monitor

When the charger is working, you can check the charging capacity, battery voltage, charging time and internal resistance on the screen. More important, the voltage curve can be displayed on the screen, so you can monitor the charging status.

Internal Independent Lithium Battery Balancer

ORCA charger employs an individual-cell-voltage balancer. It isn't necessary to connect an external balancer for balance charging.

Balancing Individual Cells Battery Discharging

During the process of discharging, ORCA charger can monitor and balance each cell of the battery individually. Error message will be indicated and process will be ended automatically if the voltage of any single one cell is abnormal.

Fast and Storage Mode of Lithium battery

Purposes to charge lithium battery varies, "fast " charge reduce the duration of charging, whereas "store" state can control the final voltage of your battery, so as to store for a long time and protect useful time of thebattery

Lndependent Balance function

When the battery performance declines and vlitage difference increases, the balance function of charger will to work. The equalizer circuit will work independently and reduce the voltage difference to below 0.01V, which can prolong the lifetime of battery and reduce risks due to over discharge.

MAIN FEATURES

Memory Preset
The charger can store up to 20 different charge/discharge profiles for your convenience. You can keep the data pertaining to program setting of the battery of continuous charging or discharging. Users can call out these data at any time without any special program setting.

Terminal Voltage Control (TVC)
The charger allows user to set the charge/dischareg and voltage.

Capacity Limit
The charging capacity is always calculated as the charging current multiplied ba time. if the charging capacity exceeds the limit, the process will be terminated automatically when you set the maximumvalue.

Processing Time Limit
You can also limit the maximum process time to avoid any possible defect.

PC Control Software "Charge Master"
Please download the ''PC Monitor" software on our website: www.ev-peak.com.
There is mini USB port in the charge which can be used to connect it to the PC. You need optional USB cable (USB A Male to Mini B Male) which is not included in the package. The free "Charge Master"software gives you unparalleled ability to operate the charger through your computer. You can update firmware from "Charge Master".

Inner Resistance of Battery Pack
Measure Inner resistance of battery pack inclusively all connections and leads.

Regenerative Discharging
The user can transfer the battery energy to the car battery or other energy storage equipment.

These warnings and safety notes are particularly important. Please follow the instructions for maximum safety; otherwise the charger and the battery can be damaged or at worst it can cause a fire.

⚠ Never leave the charger unattended when it is connected to its power supply. If any malfunction is found, TERMINATE THE PROCESS AT ONCE and refer to the operation manual. If any malfunction is found, TERMINATE THE PROCESS AT ONCE and refer to the operation manual.

⚠ Keep the charger well away from dust, damp, rain, heat, direct sunshine and vibration. Never drop it.

⚠ The allowable DC input voltage is 11-32V DC.

⚠ This charger and the battery should be put on a heat-resistant, noninflammable and nonconductive surface. Never place them on a car seat, carpet or similar. Keep all the inflammable volatile materials away from operating area.

⚠ Make sure you know the specifications of the battery to be charged or discharged to ensure it meets the requirements of this charger. If the program is set up incorrectly, the battery and charger may be damaged. It can cause fire or explosion due to overcharging.

⚠ Always connect the charge cable to the charger first,then connect the battery to avoid short circuit between the charge leads.Reverse the sequence when disconnecting.

⚠ **Never attempt to charge or discharge the following types of batteries.**

- A battery pack, which consists of different types of cells (including different manufacturers)
- A battery that is already fully charged or just slightly dis charged.
- Non-rechargeable batteries (Explosion hazard).
- A faulty or damaged battery.
- A battery fitted with an integral charge circuit or a protection circuit.
- Batteries installed in a device or which are electrically linked to other components.
- Batteries that are not expressly stated by the manufacturer to be

⚠ suitable for the currents the charger delivers during the charge process.

Please bear in mind the following points before commencing charging:

- Did you select the appropriate program suitable for the type of battery you are charging?
- Did you set up adequate current for charging or discharging?
- Have you checked the battery voltage? Lithium battery packs can be wired in parallel and in series, i.e. a 2 cell pack can be 3.7V (in parallel) or 7.4V (in series).
- Have you checked that all connections are firm and secure? Make sure there are no intermittent contacts at any point in the circuit.

※ Standard Battery Parameters

	LiPo	LiIon	LiFe	LiHV	NiCd	MiMH	Pb
Nominal Voltage	3.7V/cell	3.6V/cell	3.3V/cell	3.7V/cell	1.2V/cell	1.2V/cell	2.0V/cell
Max Charge Voltage	4.2V/cell	4.1V/cell	3.6V/cell	4.35V/cell	1.5V/cell	1.5V/cell	2.46V/cell
Storage Voltage	3.8V/cell	3.7V/cell	3.3V/cell	3.85V/cell	n/a	n/a	n/a
Allowable Fast Charge	≦1C	≦1C	≦4C	≦1C	1C-2C	1C-2C	≦0.4C
Min.Discharge Voltage	3.0-3.3V/cell	2.9-3.2V/cell	2.6-2.9V/cell	3.1-3.4V/cell	0.1-1.1V/cell	0.1-1.1V/cell	1.8V/cell

⚠ Be very careful to choose the correct voltage for different types of battery otherwise you may cause damage to the batteries. Incorrect settings could cause the cells to fire or Explode.

⚠ Charging

During charge process, a specific quantity of electrical energy is fed into the battery. The charge quantity is calculated by multiplying charge current by charge time. The maximum permissible charge current varies depending on the battery type or its performance, and can be found in the information by the battery manufacturer. Only batteries that are expressly stated to be capable of quickcharge are allowed to be charged at rates higher than the standard charge current.

Connect the battery to the terminal of the charger: red is positive and black is negative. Due to the difference between resistance of cable and connector, the charger can not detect resistance of the battery pack, the essential requirement for the charger to work properly is that the charge lead should be of adequate conductor cross-section, and high quality connectors which are normally goldplated should be fitted to both ends.

Always refer to the manual by battery manufacturer about charging methods, recommended charging current and charging time. Especially, the lithium battery should be charged according the charging instruction provided by the manufacturer Strictly.

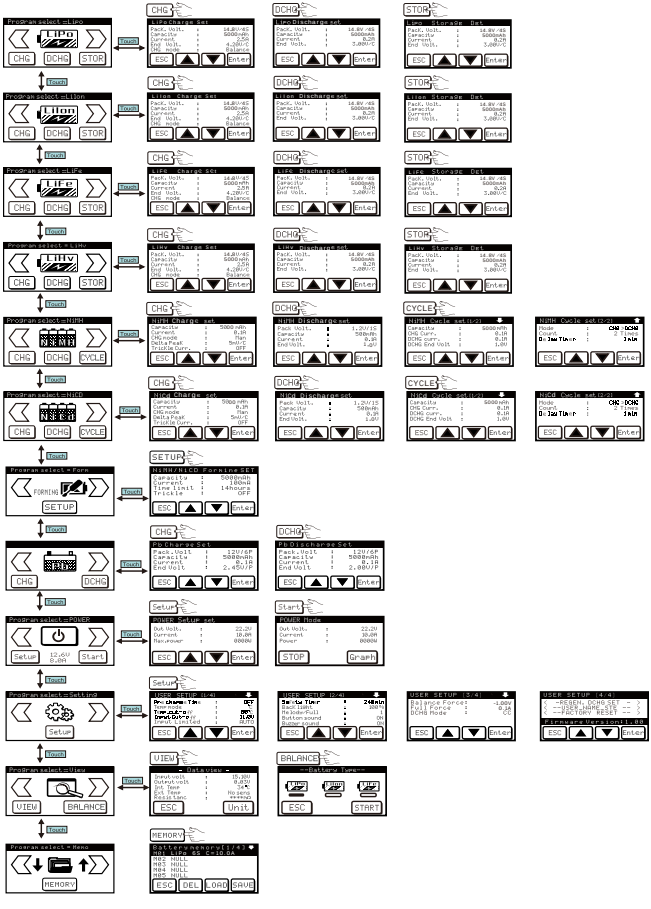
Attention should be paid to the connection of lithium battery espe cially.
Do not attempt to disassemble the battery pack arbitrarily. Please get highlighted that lithium battery packs can be wired in parallel and in series.

⚠ Discharging

The main purpose of discharging is to clean residual capacity of the battery, or to reduce the battery voltage to a defined level. The same attention should be paid to the discharging process as charging. The final discharge voltage should be set up correctly to avoid deep-dis-charging. Lithium battery can not be discharged to lower than the minimum voltage, or it will cause a rapid loss of capacity or a total failure.

Generally, lithium battery doesn't need to be discharged. Please pay attention to the minimum voltage of lithium battery to protect them. Lithium batteries are recommended to be discharged partially rather than fully. Frequent full discharging should be avoided if possible.

PROGRAM FLOW CHAT

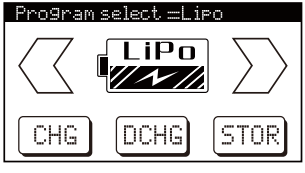


Depends on different battery types,the operating programs are different

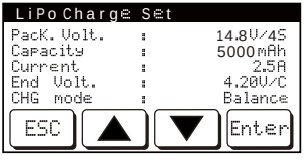
Battery type	Operation Program	Description
LiPo Lilon LiFe LiHV	Balance Charge	This charging mode is for charging LiPo/ LiFe/ Lilon/ LiHV battery in normal mode.
	Storage	This program is for discharging LiPo/ LiFe/ Lilon/LiHV battery which will not be used for long time.
	Discharge	This mode is for discharging LiPo /LiFe /Lilon /LiHV battery.
	Fast charge	This charging mode is for charging LiPo /LiFe /Lilon /LiHV battery in normal mode without balancing.
NiMH NiCd	Auto mode	Charger automatically detects the connected NiMH/NiCd battery and control the charging current in the affordable range, and limit the maximum current does not exceed the setting value. Attention: Ensure to set the maximum charging current, or it may overcharge and damage the battery.
	Man mode	Charger will charge the battery with setting current.
	Discharge	Charger will discharge the battery with setting current, operation same as lithium battery.
	Cycle	To increase the remaining usable battery life, cycling is strongly recommended. charger supports 1-5 times of charge › discharge or discharge › charge cycle.
Pb	Charge	This mode is for charging Pb battery
	Discharge	This mode is for discharging Pb battery.

1.Touch Screen Operation

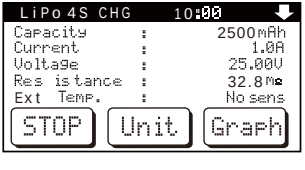
1).Press the Left and Right Arrows on the LCD Touch Screen to scroll through the main menu screens.
2).Press the action at the button of the LCD Touch Screen to enter that menu.
3).Press a parameter to highlight that parameter.
4).Press the Up and Down Arrows to edit the parameter.
5).Press "Enter" for more than 2 seconds to save the parameter and start working.
6).If there is more than one screen of parameters,press the top right corner of the LCD Touch Screen to scroll through the parameter screens.
7).Press "ESC" to return to the previous menu.
8).Press "Stop" to stop working.



Previous menu/Next menu
CHG Charge
DCHG Discharge
STOR Storage



ESC Back to the previous menu
Up
Down
Enter Enter



Next screen
STOP Stop
Unit View cell voltage and internal resistance
Graph View voltage curve during charging or discharging

2.Connection

The following describes the action process of the charger, in order to lithium polymer battery charging program as an example.

1)Connecting power

You can attach ORCA charger directly to a 11-32V output power supply via the XT60 input cable.

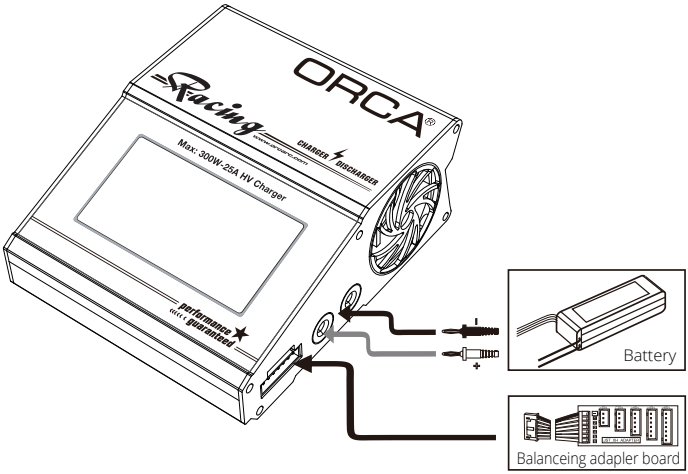
2)Connecting The Battery

Important!!! Before connecting a battery it is absolutely essential to check one last time that you have set the parameters correctly.If the settings are incorrect, the battery may be damaged, and could even burst into flames or explode. To avoid short circuits between the banana plugs, always connect the charge leads to the charger first, and only then to the battery. Reverse the sequence when disconnecting the pack. ◦

3).Balance Socket

The balance wire attached to the battery must be connected to the charger with the negative marking. Take care to maintain correct polarity! (See the wiring diagram below.)

⚠ Ensure to connect the battery to balance port when charging LiPo, Lilon, LiFe and LiHV battery under balance mode.



Connection Steps

1. Connect the charger DC input cable to a power source.
2. Connect the charge lead and balance adapter board to charger, making sure that the positive and negative connectors are not reversed.
3. Insert the battery balance lead to balance adapter board.
4. Connect the battery connector to the charge lead.
5. Select the program and charging settings.
6. Start battery charging

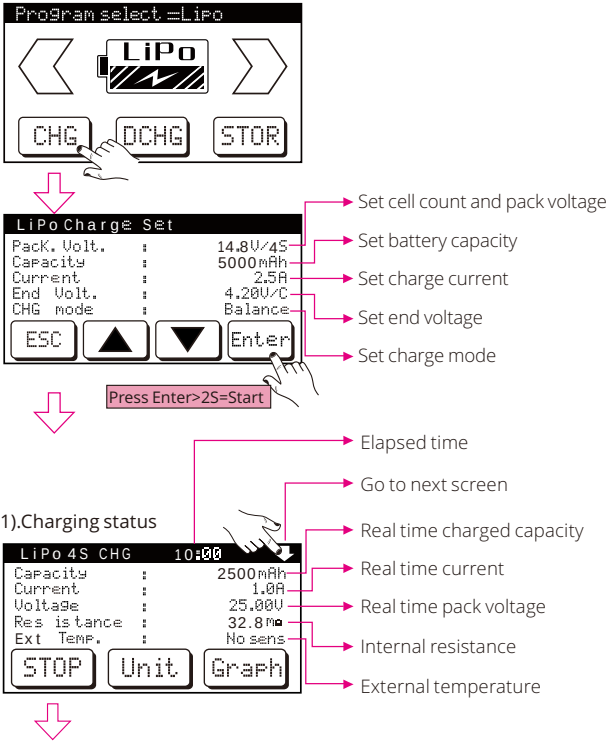
WARNING:

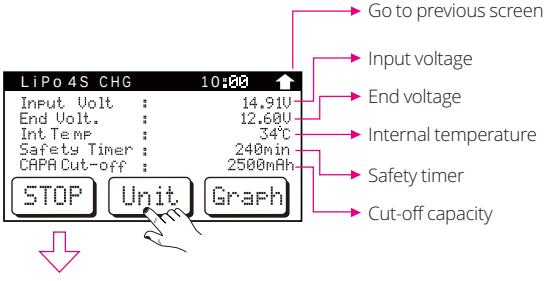
Failure to connect as shown in this diagram will damage this charger. Toavoid short circuit between the charge lead always connect the chargecable to the charger first, then connect the battery. Reverse the sequence when disconnecting.

3.Charge program

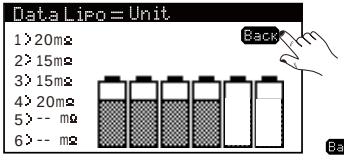
In this program,user can set the cell count,battery pack voltage,battery capacity,charge current,end voltage and charge mode,press Enter for more than 2 seconds to start charging.

Notice:According to the battery capacity setting,charger will automatically set the charge current at a rate of 1C.



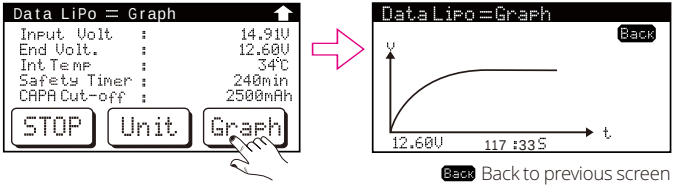


2).View cell voltage and cell resistance



Back Back to previous screen

3).View voltage curve graph during charging



Back Back to previous screen

4).Stop process finished

Press the "STOP" button to stop charging

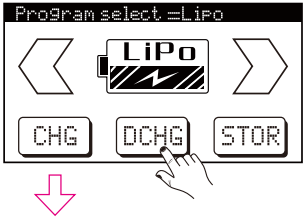
5).Process finished

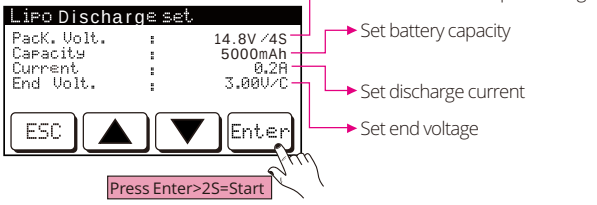
Charger will alarm once program finished

4.Discharge program

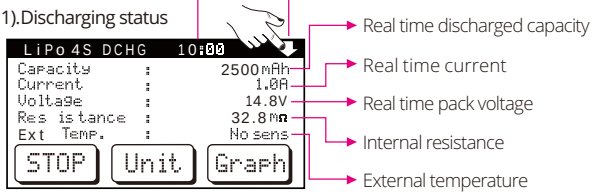
In this program,user can set the cell count,battery capacity,discharge current and end voltage.。

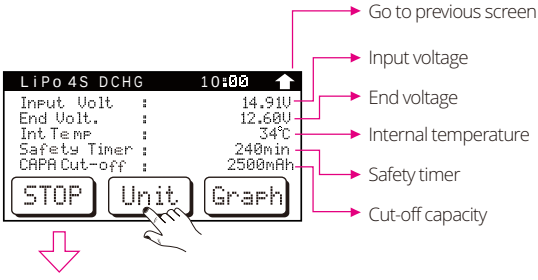
Attention:Set the correct discharge end voltage,or it will cause over discharge and damage the battery.



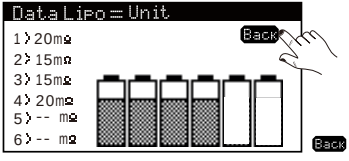


1).Discharging status



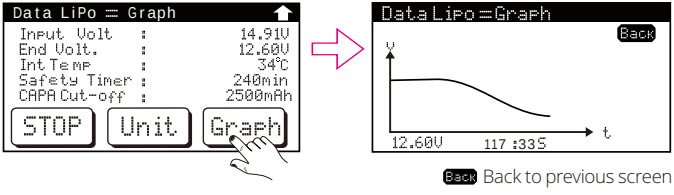


2).View cell voltage and cell resistance



Back Back to previous screen

3).View voltage curve graph during discharging



Back Back to previous screen

4).Stop process finished

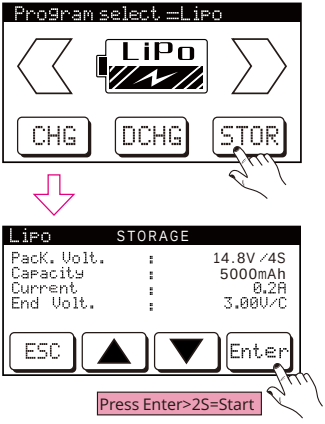
Press the "STOP" button to stop charging

5).Process finished

Charger will alarm once program finished

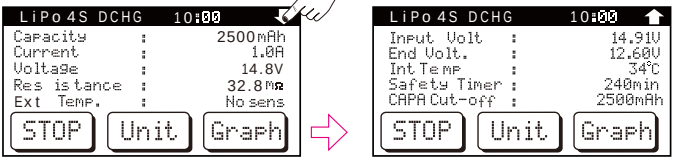
5.Storage Program for Lithium Battery

"STORAGE" is a function which is specialized for Lithium battery storage, its operation is same as the discharge program. To store for a long time and protect useful time of the battery, it automatically charge/discharge the battery to a safe voltage.



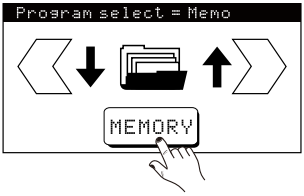
For different battery type, the end voltage are different, LiPo:3.85V, LiHV:3.85V, LiFe:3.3V, Lilon:3.75V. This is a intelligent program, it detects the battery voltage and automatically charge or discharge the battery. make sure to connect the battery to balance port when use this program.

1).Real time status during storage



6). Battery Memory

The charger can store up to 20 different charge/discharge profiles for your convenience, and the stored profiles can be recalled quickly without having to go through the setup process.



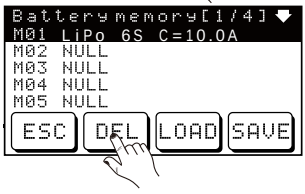
1). Save

When you finish setting the charging/ discharging/storage parameters,please press ESC to return to the main menu screen,and go to MEMORY screen.

Press SAVE,the parameters you just entered will be saved.

2). Recall

To use a memory file,press it,then press LOAD

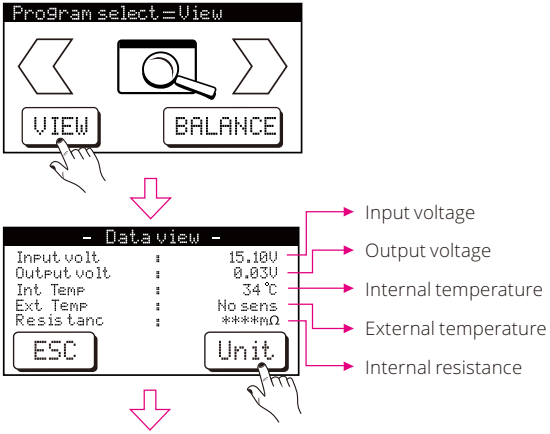


3). Delete

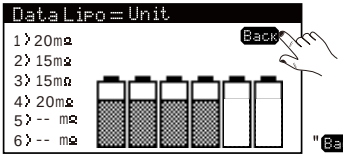
To delete a memory file,press it,then hold DEL for more than 2 seconds.

7.Data view

With this program, user can check the battery cell voltage, internal resistance,input voltage, output voltage, inner temperature and external temperature. Please connect the battery to charger output port. (both main output and balance port).



Cell voltage and cell resistance

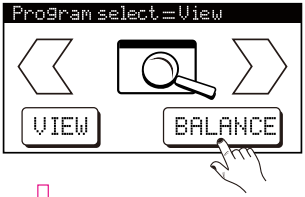


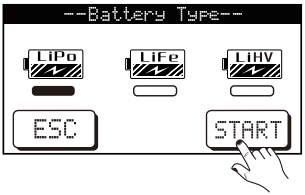
"Back" Back to the previous screen

8.Lithium battery balancer

This function is for unbalanced lithium battery pack,set the correct battery type when using this program,or it will damage the battery.

The equalizer circuit will work independently and reduce the voltage difference to below 0.02V,which can prolong the lifetime of battery and reduce risks due to over discharge.

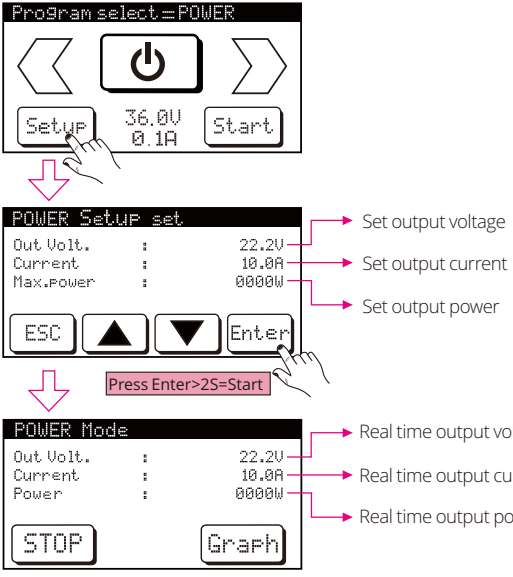


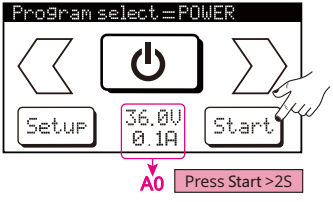


CAUTION:
Please check the battery type and settings carefully,or it may damage the battery

9.Digital Power

In this mode,charger can provide a output power of DC3.0V-24V for other device.

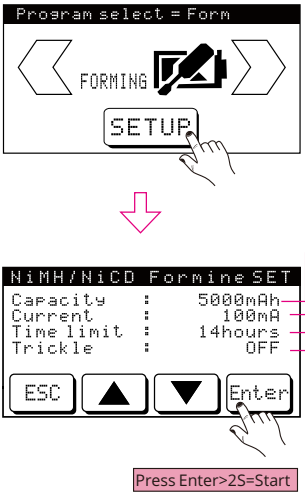




A0:It shows the last setting here,press Start for more than 2 seconds to start if do not need any changes.

10.Forming Charge

For long time not used NiMH/NiCd battery,charger will charge the battery pack by a low current for a long time,which can depolarize and reactive battery.

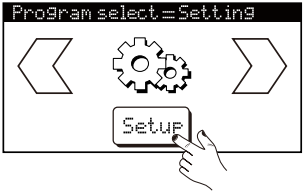


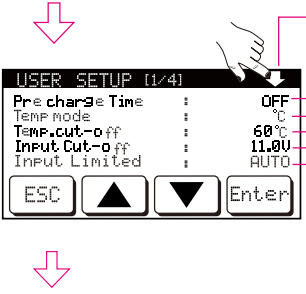
SYSTEM SETTING

Notice:Please set the parameters in Setup menu when charger is powered on for the first time.

This charger can recognize battery cell count automatically.It has a precharge function which can reactive the slightly over discharged battery.user can set the precharge time(normally 2 minutes) in the menu.the more battery capacity,the more time needed.

Attention:In the normal charge mode,always turn off the precharge program.DO NOT use this function unless you know the battery status very well.Stop the process immediately when battery voltage increase quite few,or it may cause danger!!!





Go to next screen

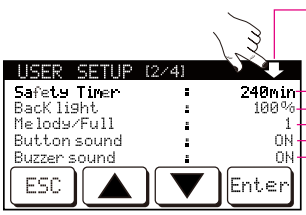
Set precharge time:OFF/1-10min.

Set temperature unit ℃/F

Set cut-off temperature,ranges from 20 ℃ to 80℃(68-176F)

Set input voltage,ranges from 11.0V to 32.0V

Set Input current limited value, 1.0A-55.0A/AUTO



Go to next screen

Set safety timer:OFF/1-720min

Set screen brightness:OFF/10%-100%

Set melody

Button sound:ON/OFF

Set buzzer volume:ON/OFF

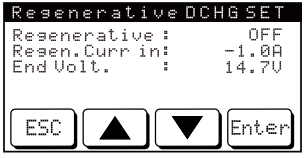
Go to next screen

Set balance force trigger voltage,for LiPo/LiFe/LiIon/LiHV battery ONLY.

Set full force

Set discharge mode CC or CV,for LiPo/LiFe/LiIon/LiHV/Pb battery ONLY.

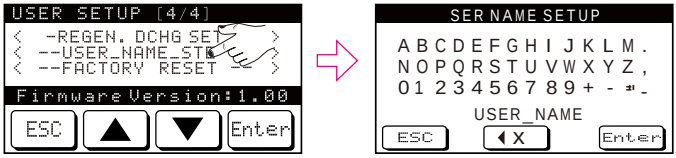
Set regenerative discharge parameter:Function ON/OFF,discharge current,End voltage



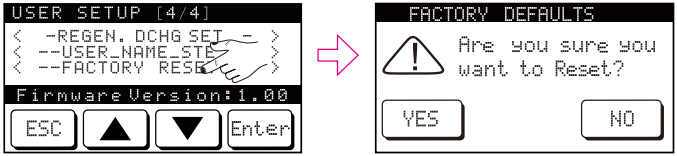
SYSTEM SETTING

Notice:When in this program,Pb battery is recommended to connect to the charger input port,DO NOT use NiMH/NiCd as a “battery power”.

User can set the user name and it will be displayed once charger powered on.



Factory reset:This operation will delete all your personal data,and reset all settings to the manufacturer default settings.



DO NOT use it unless you are sure it is necessary.

⇨ Incorrect polarity connected

⇨ Process interrupted

⇨ Output short circuit

⇨ Input voltage error

⇨ Charger fault

⇨ Battery total voltage is lower than setting value, please check the cell count.

⇨ Battery total voltage is higher than setting value, please check the cell count.

⇨ Voltage of one cell in the battery pack is too low.

ERROR MMESSAGE

⇨ Voltage of one cell in the battery pack is too high.

⇨ The battery balance connection is wrong. Please check the connector and cable.

⇨ Temperature too high, please check the temperature sensor and take cooling measures.

⇨ Output power is higher than setting in digital power mode

⇨ Output current is higher than setting in digital power mode

⇨ Limited time is reached

⇨ Limited capacity is reached

⇨ External temperature too high

COMPLIANCE INFORMATION FOR THE EUROPEAN UNION

European Compliance Information
Declaration of Conformity

CE

Product(s): Battery balance charger
Item Numer(s): **AR1**

The object of declaration described above is in conformity with the requirements of the specifications listed below, following the provisions of the European EMC Directive 2004/108/EC.

EN 55014-1:2006
EN55014-2:1997+A1:2001
EN61000-3-2:2006
EN61000-3-3:2008

RoHS

WARRANTY AND SERVICE

Thank you for purchasing this charger, we will do our best to provide you with a comprehensive after-service and protect your rights. If you have problems with this charger, please contact local distributor immediately.

The warranty does not cover incorrect installation, components worn by use, or any other problem resulting from incorrect use or handling of the product. No liability will be accepted for any damage resulting from the use of this product. By the act of connecting and operating this product, the user accepts all resulting liability.

Is considered incorrect use:

1. Failure to follow instructions.
2. Improper use of the product (abusive use, out of spec, etc.).
3. Failure to adapt settings for proper function (improper connections, wrong gearing, installation, setup, etc.).
4. Overload, overheating (disordering, melting, etc.).
5. Running in inadequate conditions (damage or rust from rain, humidity, etc.).
6. Improper maintenance (presence of dirt, etc.).
7. Disassembly, modification by the user (modifying original connectors, wires, components, etc.).
8. Mechanical damage due to external causes

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Product specifications and information in this manual are for reference only.If the content is subject to change without further notice.