INSTRUCTION MANUAL

AA/AAA NiMH BATTERY
Multi Functions Charger & Analyzer

NC2500
MULTI FUNCTIONS

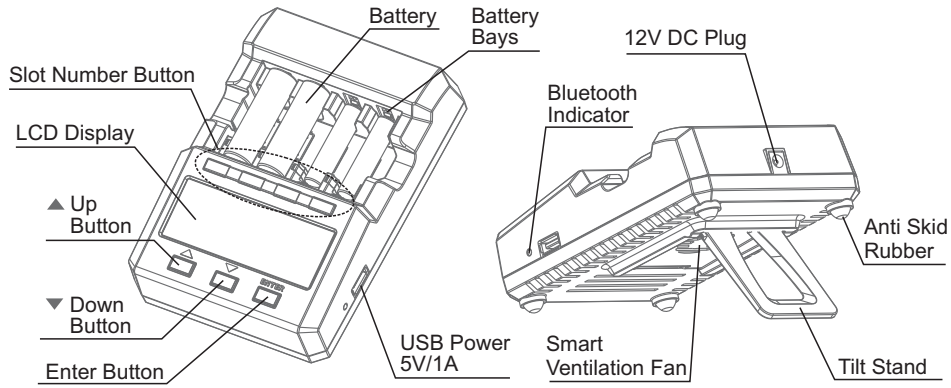
SKYRC

Manufactured by
SKYRC TECHNOLOGY CO., LTD.
www.skyrc.com

Version 1.0 7504-0361-01

INTRODUCTION

Thank you for purchasing the SKYRC NC2500 Charger-Analyzer which enables quick and optimum charging of “AA” and “AAA” rechargeable batteries. With charging ,discharging, refresh & analyze, break-in and cycle functions as well as individual LCD displays for charging status; this charging unit is reliable, user-friendly and ideal for use in the home, office or on a trip. Please read these instructions carefully and thoroughly before operating this unit.



⚠ WARNING

THE CHARGER IS RESTRICTED TO CHARGING NICD AND NIMH RECHARGEABLE BATTERIES ONLY. NEVER ADOPT THIS CHARGER TO OTHER TYPES OF BATTERIES SUCH AS ALKALINE, LITHIUM, CARBON ZINC OR OTHER TYPES THAT ARE NOT SPECIFIED.
OPERATING THIS PRODUCT INCORRECTLY CAN CAUSE FIRE AND DAMAGE TO THE BATTERIES. READ MANUAL COMPLETELY BEFORE USE.

GENERAL PRECAUTIONS

- Do not charge battery cells other than NiMH or NiCd. Please check with the battery manufacturer to ensure it can accept the programmed charging and discharging rates. Do not expose the unit to rain or moisture due to the risk of fire.
- Do not operate the charger if it appears damaged in any way.
- Always place the battery cells with positive tip facing the top. Incorrect polarity may cause fire or explosion. Observe polarity diagrams located on the charger.
- Do not allow the unit to be exposed to direct sunlight. Operate in well-ventilated area. Do not place unit on the carpet.
- Do not allow the battery terminals to become shorted.
- Use only the supplied adapter or optional car adapter.
- The rechargeable batteries may become hot during charging(especially when high charging current is chosen). User shall take extra care when taking out the batteries after charging.
- Unplug the charging unit from the power source when not in use.

FEATURES

- Four independent slots
  There are four independent charger-analyzers for AA and AAA NiMH/NiCd batteries.
- Larger LCD display with backlit for easy reading.
  Digitally display various modes during operation. Also the charging current (in mA), accumulated charging capacity (in mAh), the voltage (in Volt) and time elapsed (in hh:mm)
- Seven buttons for easy programming and operation
  Four Slot Number Buttons (SNB) to display individual slot operation data during the various operation mode, and other three buttons for programming and operation.
- Five modes of operation: Charge, Refresh & Analyze, Break-In, Discharge and Cycle.
- Turbo fast charging - 60 minutes to charge up 2500 mAh battery
- Charging current from 200mA to 2500mA.
- Discharging current from 100mA to 1000mA.
- Smart phone control-support both APPLE iPhone and Android smart phone
- Negative delta peak value adjustment via smart phone
- Battery internal resistance and voltage graphic can be displayed via smart phone
- USB ports, 5V 1A for charging smart phone, MP3 and digital camera
- Smart cooling fan
- Worldwide voltage AC adaptor (12V / 2.5A)
- Damaged battery detection: To ensure safety, the charger performs an “impedance check” at the beginning of the program. If the battery fails this test, “FAIL” would be displayed and program will be terminated.
- Built-In PTC thermistor to avoid over heat and independent negative delta V eliminates over and undercharging.
- Firmware is ungradable via smart phone.

SPECIFICATION

	Stand Alone Mode	Smart Phone Control Mode
Charging Current	0.2-2.5A	0.2-2.5A
Delta Peak	5mV	3-15mV
Discharging Current:	0.1-1.0A	0.1-1.0A
Discharging Termination Voltage	0.9V	0.5-1.0V
Battery Capacity Range	500mAh-3500mAh	500mAh-3500mAh
No. of Cycle	1-12	1-12
Top off Charging Current	100mA	100mA
Maintenance Charging Current (Trickle)	30mA	30mA
Temperature Protection	55℃	55-70℃
Input Power	12V/2.5A	
USB Power	5V/1A	
Weight	370g	
Dimensions(LxWxH)	154x104x50mm	

SPECIFICATIONS ARE SUBJECT TO CHANGE.

INFORMATION DISPLAY ON CHARGER & SMART PHONE

	Stand Alone Mode	Smart Phone Control Mode
Charge/Discharge Mode	Yes	Yes
Charge/Discharge Time	Yes	Yes
Charger Status	Yes	Yes
Charge/Discharge Capacity	Yes	Yes
Charge/Discharge Current	Yes	Yes
Battery Voltage	Yes	Yes
Battery Temperature	Not Available	Yes
Battery Internal Resistance	Not Available	Yes
Battery Voltage Graphic	Not Available	Yes

GENERAL BATTERY KNOWLEDGE

Battery Capacity(mAh):
Milliamp hours: mAh is the capacity of the battery or the amount of charge added to a battery.

What is 0.1C, 0.2C, etc?
“C” stands for the battery capacity and the number in front of it is the fraction of the battery capacity. For example, 0.1C means 0.1 times the capacity for the battery. For a 2700mAh battery, 0.1C would be 0.1 times 2700mAh which equals 270mA.

Choosing the right charging & discharging rate
Charging at a rate below 0.33C and above 1.0C is not recommended. Charging too slow may prevent the charger from terminating correctly.

Charging too fast may damage the battery.
Typically speaking, slower charging rate will yield better battery performance but requires longer time. Faster charging rate may not charge as fully and battery temperature can be higher.

Battery Matching
In most devices, usually two or more batteries are used together. When batteries are used in a series, the performance is limited by the worst one. In other words, one poorly performing battery can significantly reduce the device runtime.
Battery matching refers to grouping batteries with similar “actual” capacity. To perform this, use the Refresh & Analyze mode to determine the battery capacity. Group batteries with capacity within about +/- 5% of the rated capacity.

Battery “Forming”
New batteries and those stored for extended period become chemically deactivated. Battery forming is a charge-discharge-charge cycle which forces a full charge into the battery at a very slow rate. This process activates the battery. In certain cases, it needs to be repeated two or three times.
Battery forming can be performed using the Break-In mode.

Trickle charging
After the rechargeable battery is fully charged in any of the operating modes, the charger will give a small amount of current to the rechargeable batteries to maintain the fully charged level. This mode is automatically launched after rechargeable batteries are fully charged and kept in the charging unit. The signal —DONE will be displayed on the LCD.

Batteries are getting warm.
It is common for batteries to get warm while charging. The charger has a built in temperature sensor which will stop the charging cycle if it has become too hot. Charging may resume when the battery has cooled.
Allow batteries to cool before placing into a product to be used.

MODES OF OPERATION

This section explains various modes and when to use them. To enable each mode, refer to the "Operation" section.

1. **Charge:**
   Charge the battery at the selected rate. Suitable for batteries used frequently.
2. **Discharge:**
   Discharges the batteries at the selected rate.
3. **Refresh & Analyze:**
   Suitable for batteries stored for more than two weeks but less than 3 months or the batteries showing poor performance. This mode can also determine the battery capacity for battery matching. In most devices, usually two or more batteries are used together. When batteries are used in a series, the performance is limited by the worst one. In other words, one poorly performing battery can significantly reduce the runtime. Battery matching refers to grouping batteries with similar "actual" capacity. To perform this, use the Refresh & Analyze mode to determine the battery capacity. Group batteries with capacity within about +/- 5%of the rated capacity.
   The charger will charge battery to full and rest for one hour, discharge, rest one hour again then recharge. You can select charging and discharging rate.
4. **Break-In (Battery Forming):**
   New batteries and those stored for more than 3 months extended period become chemically deactivated. Battery forming is a charge-discharge-charge cycle which forces a full charge into the battery at a very low rate. This process activates the battery. In certain case, it needs to be repeated two or three time.
   Charges battery at 0.1C for 16 hours, rest for one hour, discharges battery at 0.2C, then recharges again at 0.1C for 16 hours.
5. **Cycle:**
   Performs charge-discharge cycle for up to 12 times. Cycle mode can remove memory effect of rechargeable batteries. This mode will recharge battery after final cycle.

Battery Condition	Mode
NiMH batteries that have been used frequently (at least once every two weeks)	Charge
Batteries in storage for more than two weeks but less than 3 month	Refresh & Analyze
Batteries in storage for more than 3 month	Break-In
Batteries showing poor performance	Cycle for two to three times.

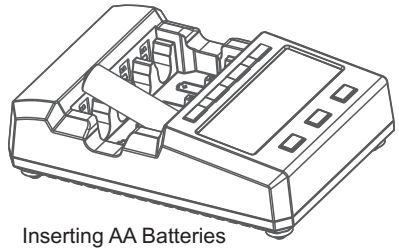
Battery Rescue Steps

For batteries that do not perform favorably after using the mode recommended above, the following sequence can be applied.

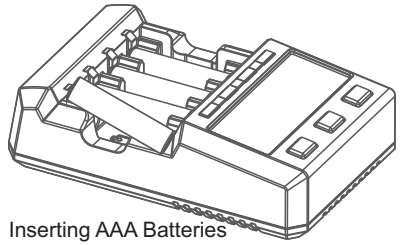
1. Cycle for one to three times.
2. If capacity is still low, use Break-In mode.
3. If the step 1 to step 2 shows some capacity improvement (> 10%), repeat Break-In mode for one to three times. If no significant improvement, battery probably at end of useful life.

OPERATIONS STEPS

1. Connect the power adapter DC connector to the charger and then plug the power adapter into outlet (100-240V AC, 50/60Hz).
2. Insert AA or AAA battery

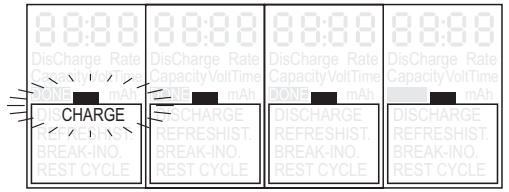


Inserting AA Batteries

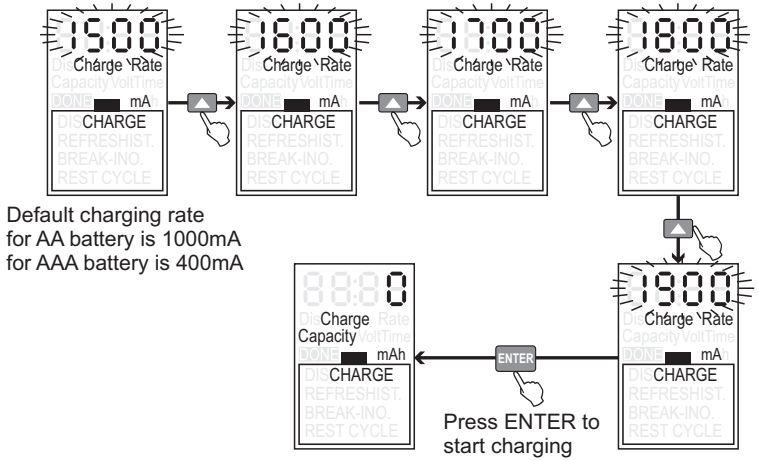


Inserting AAA Batteries

3. When a new battery is inserted and detected, the battery sign and "CHARGE" in correspond slot will blinking. Use the UP and DOWN arrow buttons to toggle the desired mode. Press ENTER to make the selection. If no button is pressed within five seconds, the charger will proceed to the default mode which is charging with 1000mA rate for AA battery and 400mA rate for AAA battery.

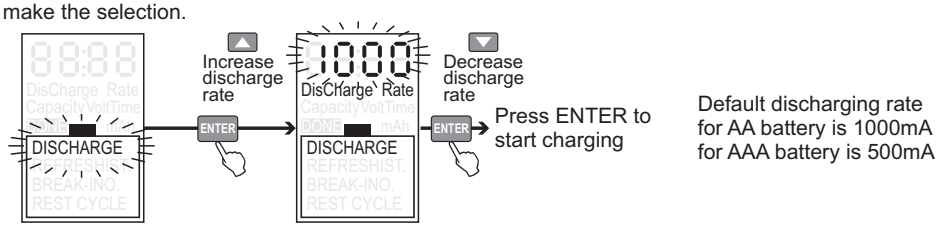


4. If CHARGE mode is selected. The charger will prompt for the charging rate by flashing "Charge Rate". Use the UP and DOWN button to choose the desired current. Press ENTER to confirm the selection. Refer to the "General Battery Knowledge" section for choosing an appropriate rate.

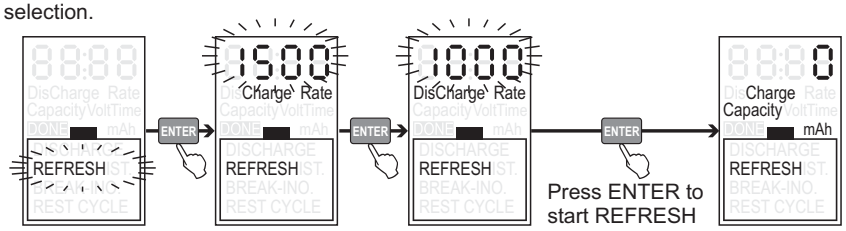


Default charging rate
for AA battery is 1000mA
for AAA battery is 400mA

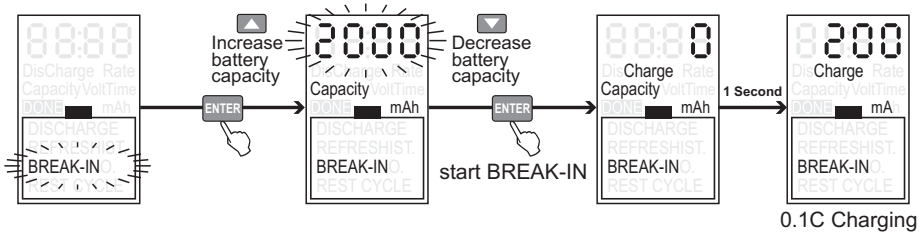
5. If DISCHARGE mode is selected: The charger will prompt for discharging rate by flashing “DisCharge Rate”. Use UP and DOWN button to choose the desired current. Press ENTER to make the selection.



6. If REFRESH & ANALYZE mode is selected: The charger will prompt for the charging rate by flashing “Charge Rate”. Use the UP and DOWN button to choose the desired current. Press ENTER to make confirmation. Then it will prompt from the discharging rate by flashing “DisCharge Rate”. Use the UP and DOWN button to choose the desired current. Press ENTER to make the selection.



7. If BREAK-IN mode is selected: The charger will prompt for the battery capacity in order to calculate the charging and discharging rate automatically. “mAh” will flash. Use the UP and DOWN button to choose the battery capacity. Press ENTER to make selection.



8. If CYCLE mode is selected: The charger will prompt for the charging rate and discharging rate similar to the other modes. In addition, it will also prompt for the number of cycle to be performed by flashing “No. Cycle”. Use the UP and DOWN buttons to choose the desired cycles. Press ENTER to make the selection.

DISPLAY INFORMATION

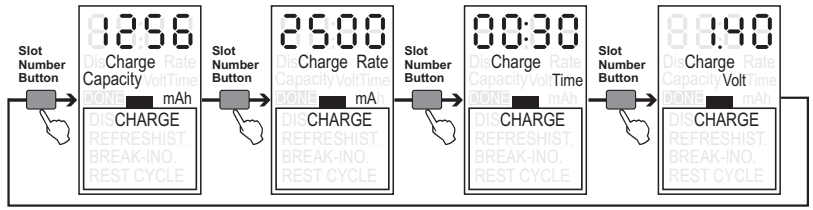
LCD backlit will turn off after 10 minutes if no buttons are pressed. You can turn on LCD backlit again by press any button.

The display information will cycle automatically. Press Slot Number Button will make display information static. Please and hold Slot Number Button more than 5 seconds will make the display information cycle automatically again.

Slot Number button (1~4)

Press and release the Slot Number button to toggle display between: accumulated capacities (in mAh), charging current (in mA), time elapsed (in hh:mm), and the voltage (in Volt) .

The following information is displayed on the screen:



Capacity:

This is the number followed by the unit “mAh.” This is the accumulated charging or discharging capacity. If it is charging capacity, “CHARGE” in battery box will be shown. If it is discharging capacity, “DISCHARGE” in battery box will be shown.

Note the charging capacity is usually higher than the actual capacity of the battery owing to some energy lost as heat. Charging capacity cannot be used to judge the performance the battery. Instead, it can only be used to determine the progress of the charger.

Current:

This is the number followed by the unit “mA.” This is the approximate charging or discharging current. Note that this number will go up and down due to the pulse charging.

Time:

This is the number followed by the unit “Time.” This is the time elapsed for the particular routine such as charging, discharging or rest in the program.

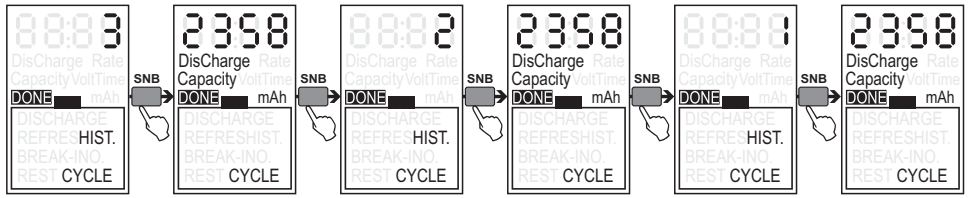
Voltage:

This is the number followed by the unit “Volt.” It represents the offline battery voltage.

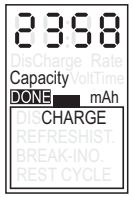
Cycle:

For CYCLE mode, the discharge capacity of cycle is displayed. “HIST. CYCLE” icon will also be shown. Use the Slot Number Button to access discharge capacity for all the cycles performed. The capacity information will be stored as long as the battery is inserted in the charger. It will be lost upon removal of the battery.

Use SNB to recall discharge capacity for all the cycles performed.



When the program for a slot is completed, DONE will displayed. With the exception of DISCHARGE mode, top off charge and trickle charge (continuous) will be applied. For CHARGE mode, the total charged capacity will be displayed. For REFRESH & ANALYZE, BREAK-IN, DISCHARGE mode, the total discharge capacity will be displayed.



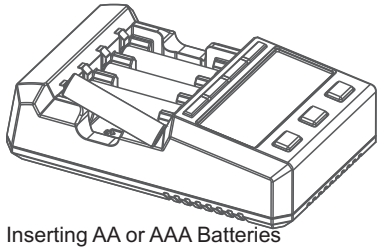
OPERATION WITH iPHONE

Pairing Charger with iPhone

Pairing occurs when two Bluetooth devices communicate with each other and establish a connection. A record of information about this connection is then stored in the memory of each device. Once you pair a device with the NC2500 charger, you should not have to pair it again.
The NC2500 charger can pair with up to eight devices. However, it can only connect to, and control the NC2500 charger from one device at a time.

To begin pairing with your iPhone, iPod or iPad

1. Connect the power adapter DC connector to the charger and then plug the power adapter into outlet (100-240V AC, 50/60Hz).
2. Insert AA or AAA battery
   When a new battery is inserted and detected, the battery sign and “CHARGE” in correspond slot will blinking. Please wait five seconds, the charger will proceed to the default mode which is charging.
3. Push and hold “ENTER” button for five seconds, the bluetooth LED indicator on the charger is blinking in blue to show the charger is discoverable.


Inserting AA or AAA Batteries

4. Select the Bluetooth menu from your iPhone or iPad and ensure the Bluetooth is turned on.
5. Find the NC2500 Charger which will be identified as “SKYRC + 4 digits serial number”. For example, SKYRC1234 and select it.
   Confirm that you want to connect the NC2500 Charger with your iPhone or iPad by selecting it.
6. A confirmation “Connected” appears on your phone after you have selected the NC2500 Charger. It takes few seconds to finalize the pairing process, please wait for while.
7. The Bluetooth indicator, located on the right side of charger remains steadily on.
8. Your NC2500 Charger is now connected with your iPhone or iPod.

Useful Notes And Tips

You can only connect your NC2500 charger with one device at a time.

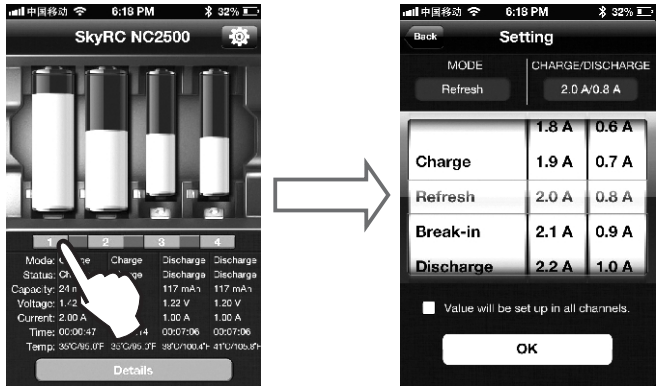
The charger can hold up eight paired devices. When the memory is full and additional device cannot be paired. If you want to pair new devices, you need clearing all the memory.

Clearing memory

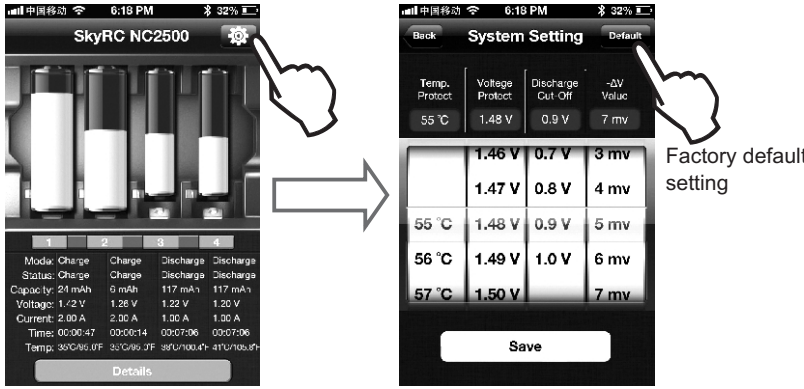
To clear the charger memory of all devices, Press and hold “UP” and “DOWN” button simultaneous for five seconds, The charger clears all devices from its memory.

Operation with Your iPhone

Touch slot number button(1-4) to change operation mode and current.

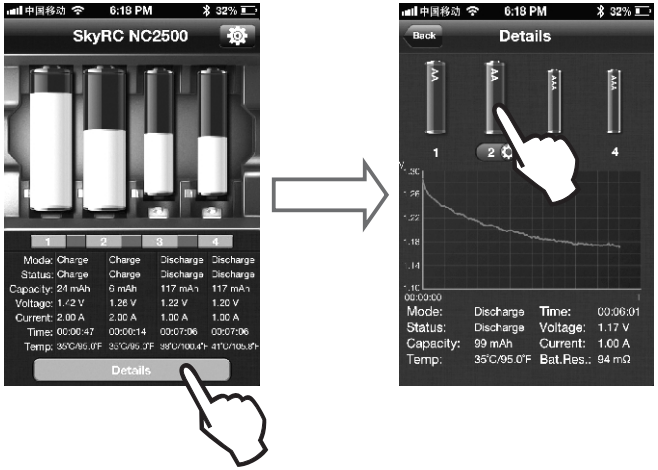


Touch system setting icon to change value of temperature protection, voltage protection, discharge cut-off voltage and negative delta V.



Factory default setting

Touch “Details” icon to show voltage graphic and battery internal resistance.



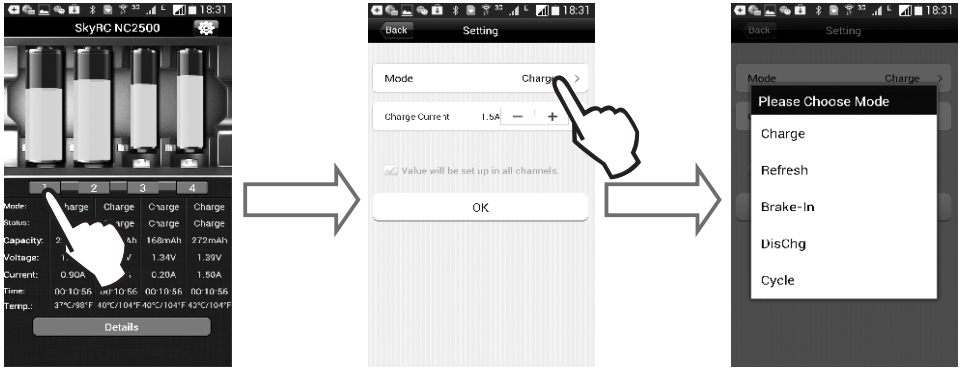
OPERATION WITH ANDROID PHONE

Pairing Charger with Android Phone

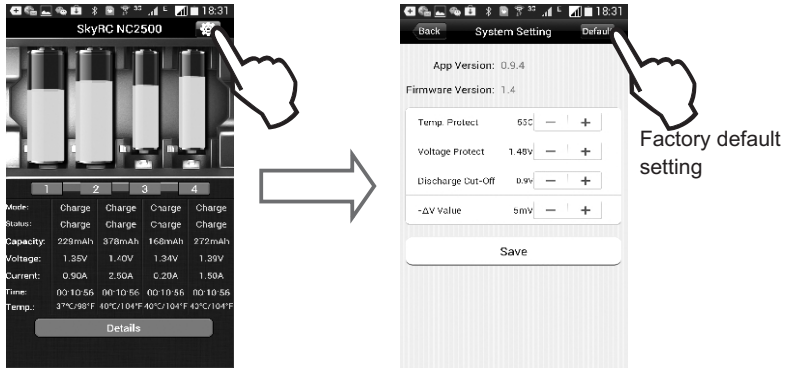
1. Connect the power adapter DC connector to the charger and then plug the power adapter into outlet (100-240V AC, 50/60Hz).
2. Insert AA or AAA battery
   When a new battery is inserted and detected, the battery sign and “CHARGE” in correspond slot will blinking. Please wait five seconds, the charger will proceed to the default mode which is charging.
3. Push and hold “ENTER” button for five seconds, the bluetooth LED indicator on the charger is blinking in blue to show the charger is discoverable.
4. When the Apps starts in Android, bluetooth will be enabled and paired automatically.

Operation with Your Android Phone

Touch slot number button(1-4) to change operation mode and current.

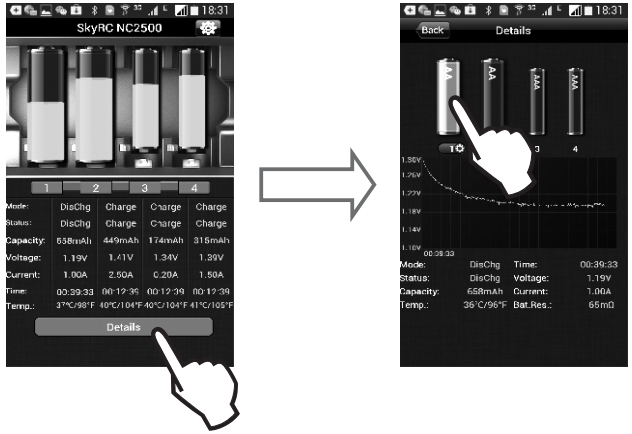


Touch system setting icon to change value of temperature protection, voltage protection, discharge cut-off voltage and negative delta V.



Factory default setting

Touch “Details” icon to show voltage graphic and battery internal resistance.



CONFORMITY DECLARATION

SKYRC NC2500 satisfies all relevant and mandatory CE directives and FCC SubPart C Intentional Radiators section 15.247
The product has been tested to meet the following technical standards:

	Test Standards	Title	Result
CE-R&TTE	EN 300328	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques article 3.1(b) EMC requirements	Conform
	EN 301489-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services. Part 1: Common technical requirements	Conform
	EN 301489-17	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services. Part 17:Specific conditions for Broadband Data Transmission Systems article 3.1(a) Health requirements	Conform
	EN 62479	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz) article 3.1(a) Safety	Conform
FCC	FCC SubPart C Intentional Radiators section 15.247	Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz.	Conform

FCC Note
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.
To maintain compliance with FCC's RF exposure guidelines, this equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.
Hereby, SKYRC Technology Co.,Ltd. declares that this [type of equipment AA/AAA NiMH/NiCd BATTERY CHARGER & ANALYZER is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

This symbol means that you must dispose of electrical devices from the General household waste when it reaches the end of its useful life. Take your charger to your local waste collection point or recycling centre. This applies to all countries of the European Union, and to other European countries with a separate waste collection system.

LIABILITY EXCLUSION

This charger is designed and approved exclusively for use with the NiMH/NiCd battery. SKYRC accepts no liability of any kind if the charger is used for any purpose other than that stated.
We are unable to ensure that you follow the instructions supplied with the charger, and we have no control over the methods you employ for using, operating and maintaining the device. For this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect use and operation of our products, or which are connected with such operation in any way. Unless otherwise prescribed by law, our obligation to pay compensation, regardless of the legal argument employed, is limited to the invoice value of those SKYRC products which were immediately and directly involved in the event in which the damage occurred.

WARRANTY AND SERVICE

We guarantee this product to be free of manufacturing and assembly defects for a period of one year from the time of purchase. The warranty only applies to material or operational defects, which are present at the time of purchase. During that period, we will repair or replace free of service charge for products deemed defective due to those causes.
You will be required to produce proof of purchase (invoice or receipt). This warranty is not valid for any damage or subsequent damage arising as a result of misuse, modification or as a result of failure to observe the procedures outlined in this manual.

CHARGING TIME WITH VARIOUS CHARGING CURRENT

Size of battery	Battery Capacity	Charging current (mA)	Estimated charging time
AA	2600mAh	2500	~60 min
		2300	~65 min
		2000	~70 min
		1800	~80 min
		1500	~100min
		1000	~2 hr 30min
		700	~3 hr 30 min
		500	~5 hr
		200	~12 hr
AA	2000mAh	2000	~60 min
		1800	~70 min
		1500	~80 min
		1000	~2 hr
		700	~3 hr
		500	~4 hr
		200	~10 hr
AAA	1000mAh	1000	~60 min
		800	~65 min
		700	~70 min
		500	~1 hr 40min
		200	~4 hr