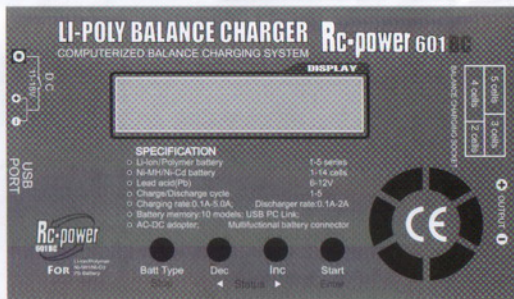# Operating Manual

# R/C POWER
# 601BC

Microprocessor controlled high-performance rapid charger/discharger for NiCd/NiMH/Li-poly/Pb batteries with cell voltage balancer.

## Charge current up to 5A, 1 to 5 series of Li-ion/poly, 1~14 cells of NiCd/NiMH, 6 to 12V lead acid(Pd)

**LI-POLY BALANCE CHARGER** Rc-power 601BC
COMPUTERIZED BALANCE CHARGING SYSTEM

DC
Ni-MH

DISPLAY

USB
PORT

**SPECIFICATION**
◇ Li-ion/Polymer battery                    1-5 series
◇ Ni-MH/Ni-Cd battery                       1-14 cells
◇ Lead acid(Pb)                             6-12V
◇ Charge/Discharge cycle                    1-5
◇ Charging rate0.1A-5.0A;        Discharger rate:0.1A-2A
◇ Battery memory:10 models;      USB PC Link;
◇ AC-DC adapter;                 Multifunctional battery connector

Rc-power
601BC

FOR  LithiumPolymer
     Ni-MH/Ni-Cd
     Pb Battery

Batt Type    Dec    Inc    Start
                    ◄ Status ►     Enter

CE

5 cells  4 cells  3 cells  2 cells
Balance connector socket

output

Thank you for purchasing the RC-power 601BC. You get a rapid charger that is computerized with a high performance microprocessor and specialized operating software. It can maintain your battery at its best condition and also control them safety.

Please read this entire operating manual completely and attentively as it contains a wide variety of specific programming and safety information.

You need to keep this manual in a safe place, and be sure to pass it on to the new owner if you ever dispose of RC-POWER 601BC.

## ● Special features

### -Voltage balancer for Li-polymer battery
BC has an individual-cell-voltage balancer inside. So it does not need any balancer separately when charging Li-poly battery for cell balancing.

### -Maximum safety
Delta-peak sensitivity: The automatic charge termination program works on the principle of the Delta-peak voltage detection.

Capacity limit: The charging capacity always calculated by multiple of the charging current and time. If the charging capacity exceeds the limit the process will be terminated automatically when you set the maximum value.
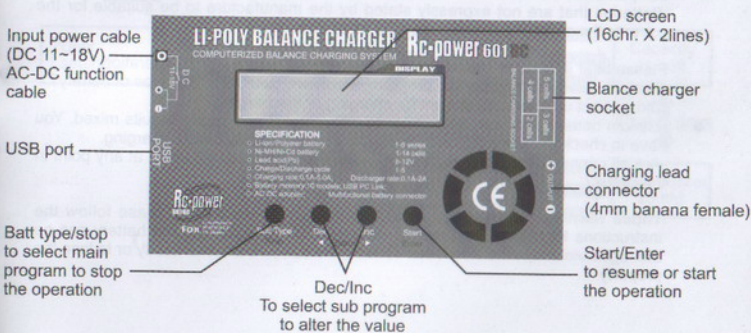
Temperature limit: The temperature of the battery on charging will rise by its internal chemical reaction. If you set the limit of temperature the process will be expired forcibly when the limit has reached.

Processing time: You can also restrain the maximum process time to prevent from any possible defect.

Input power monitor: To protect the car battery using as input power from being damaged the voltage of it always monitored. If it drops below the lower limit the process will be ended automatically.

### -High-power and high-performance circuit
BC employs the circuit that has maximum output power of 50W. As a result it can charge or discharge up to 14 cells of NiCd/NiMH and 5 series of Li-poly batteries with maximum current of 5.0A.



Input power cable (DC 11~18V) AC-DC function cable

USB port

Batt type/stop to select main program to stop the operation

Dec/Inc To select sub program to alter the value

LCD screen (16chr. X 2lines)

Blance charger socket

Charging lead connector (4mm banana female)

Start/Enter to resume or start the operation

**LI-POLY BALANCE CHARGER Rc-power 601BC**
COMPUTERIZED BALANCE CHARGING SYSTEM

DISPLAY

SPECIFICATION
○ Lithium/polymer battery          1-5 series
○ Ni-NiMH-Cd battery               1-14 cells
○ Lead acid(Pb)                    3-12V
○ Charge/Discharge cycle           1-5
○ Charging rate 0.1A-5.0A          Discharger rate 0.1A-2A
○ Battery memory 10 models, USB PC Link
○ DC-DC adapter                    Multi/columned battery connector

Rc-power

- Never leave the charge unsupervised when it is connected to its power supply. If any malfunction is observed immediately terminate the process and refer to the operation manual.

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

- This unit and the battery to charge or discharge should be set up on a head-resistant, non-inflammable and non-conductive surface. Never place them on a car seat, carpet or similar.
- Keep all the inflammable volatile materials well away from operating area.
  Be sure to understand the information of the battery to be charged or discharged accurately. If the program is set up incorrectly the battery can severely be damaged.
- Especially Lithium battery can cause a fire or an explosion by over-charging.

- To avoid short-circuits between the charge lead, always connect the charge cable to the unit first and only then to the battery to be charged or discharged. Reverse the sequence when disconnecting.

- Do not connect more than one battery pack to the charge lead at any one time.

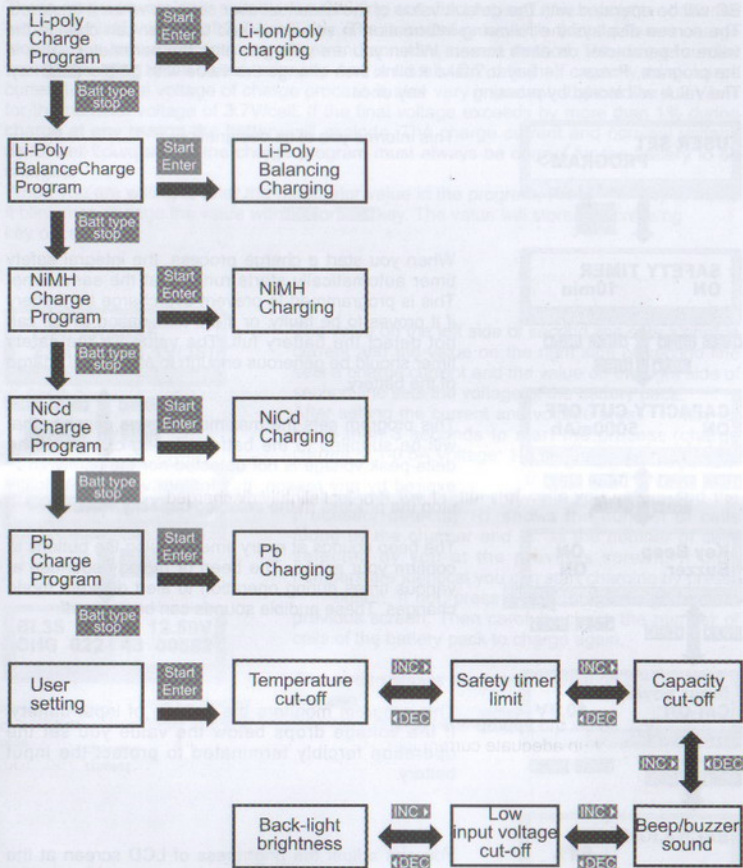- Do not attempt to charge or discharge the following types of battery.
  -Battery pack, which consists of different types of cell(including different manufacturers).
- -Battery, which is already fully charged or just slightly discharged.
  -Non-rechargeable batteries (Explosion hazard).
  -Batteries that require a different charge technique from NiCd, NiMH, Li-Poly or Pb.
  -Faulty or damaged battery.
  -Battery fitted with an integral charge circuit or a protection circuit.
  -Batteries installed in a device, or which are electronically linked to other components.
  -Batteries that are not expressly stated by the manufacture to be suitable for the currents the charger delivers during the charge process.

  Please bear in mind of checking the following point before charge operation.
  -Did you select the appropriate program, which are suitable for the type of battery?
  -Did you set up adequate current for charging or discharging?
- -Lithium battery pack can be composed with parallel and series circuits mixed. You have to check the composition of the battery pack carefully before charging.
  -Are all connections firm and safe, or is there an intermittent contact at any point in the circuit?

  Those warnings and safety notes are particularly important. Please follow the instructions for a maximum safety; otherwise the charger and the battery can be damaged violently. And also it can cause a fire to injure a human body or to lose the property.

## ● Program flow chart

| | | |
|---|---|---|
| **Li-poly Charge Program** | **Start Enter** → | **Li-Ion/poly charging** |
| ↓ **Batt type stop** | | |
| **Li-Poly BalanceCharge Program** | **Start Enter** → | **Li-Poly Balancing Charging** |
| ↓ **Batt type stop** | | |
| **NiMH Charge Program** | **Start Enter** → | **NiMH Charging** |
| ↓ **Batt type stop** | | |
| **NiCd Charge Program** | **Start Enter** → | **NiCd Charging** |
| ↓ **Batt type stop** | | |
| **Pb Charge Program** | **Start Enter** → | **Pb Charging** |
| **Batt type stop** | | |

| | | |
|---|---|---|
| **User setting** | **Start Enter** → | **Temperature cut-off** ⟷ **INC▶ ◀DEC** **Safety timer limit** ⟷ **INC▶ ◀DEC** **Capacity cut-off** |
| | | **INC▶ ◀DEC** |
| | | **Back-light brightness** ⟷ **INC▶ ◀DEC** **Low input voltage cut-off** ⟷ **INC▶ ◀DEC** **Beep/buzzer sound** |

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BC will be operated with the default value of the essential user settings when it is stared. The screen displays the following information in sequence and the user can change the value of parameter on each screen. When you are willing to alter the parameter value in the program, Press     key to make it blink then change the value with ◄DEC or INC► key. The value will stored by pressing     key once.

**USER SET**
    **PROGRAM->**
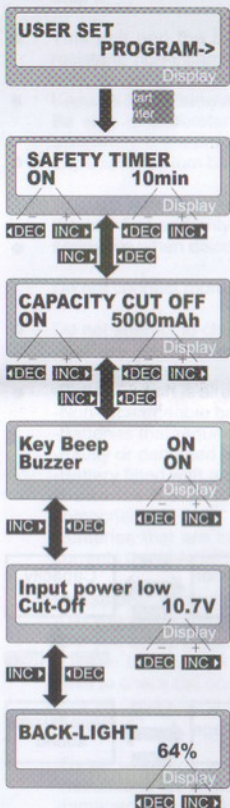
This informs you of its designation

**SAFETY TIMER**
**ON**     **10min**

◄DEC INC►   ◄DEC INC►
INC►   ◄DEC

When you start a charge process, the integral safety timer automatically starts running at the same time. This is programmed to prevent overcharge the battery if it proves to be faulty, or if the termination circuit can not detect the battery full. The value for the safety timer should be generous enough to allow a full charge of the battery.

**CAPACITY CUT OFF**
**ON**     **5000mAh**

◄DEC INC►   ◄DEC INC►
INC►   ◄DEC

This program sets the maximum charge capacity that will be supplied to the battery during charge. If the delta-peak voltage is not detected nor the safety timer expired by any reason, this feature will automatically stop the process at the selected capacity value.

**Key Beep**     **ON**
**Buzzer**     **ON**

INC►   ◄DEC    ◄DEC INC►

The beep sounds at every time pressing the buttons to confirm your action. The beep or melody sounded at various times during operation to alert different mode changes. These audible sounds can be on or off.

**Input power low**
**Cut-Off**     **10.7V**

INC►   ◄DEC    ◄DEC INC►

This program monitors the voltage of input battery. If the voltage drops below the value you set the operation forcibly terminated to protect the input battery.

**BACK-LIGHT**
    **64%**

◄DEC INC►

You can adjust the brightness of LCD screen at the charger.

These programs are only suitable for charging and discharging Lithium-polymer batteries with a nominal voltage of 3.7V/cell only. These batteries need to adopt different charge technique is termed a constant voltage and constant current method. The charge current varies according to the battery capacity. And is usually C/2 rate (half capacity as a charge current). The final voltage of charge process is also very important; it should be 4.2 V/cell for the nominal voltage of 3.7V/cell. If the final voltage exceeds by more than 1% during charge at any reason the battery will explode. The charge current and nominal voltage as for cell count set on the charge program must always be correct for the battery to be charged.

When you are willing to alter the parameter value in the program, Press    key to make it blink then change the value with◀DEC or INC▶ key. The value will stored by pressing key once.

**LiPo CHARGE**
**2.0a        11.1V(3S)**

◀DEC   +   INC▶    ◀DEC   INC▶
Batt type        Start
stop             Enter

The value on the left side of second line sets a charge current and the value on the right side of second line sets a charge current and the value on the right side of second line sets the voltage of the battery pack. After setting the current and voltage press    key for more than 3 seconds to start the process.(charge current: 0.1-0.5A,Voltage: 1-5 series)

**S : 3SER   R : 3SER**
**CONFIRM(ENTER)**

Start
Enter

This shows the number of cells you set up and the processor detects, 'R:' shows the number of cells found by the charger and 'S:' is the number of cells selected by you at the previous screen. If both numbers are identical you can start charging by press    button. If not, press Batt type stop button to go back to previous screen. Then carefully check the number of cells of the battery pack to charge again.

**BL3S  1.2A   12.59V**
**CHG  022 : 43  00682**

number  charging   battery  charged
of      time       voltage  capacity
cells
        charging
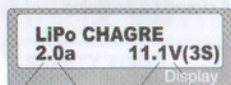        current

The screen shows the present situation during charge process.
To stop charging press Batt type stop key once.

This is for balancing the voltage of lithium batteries of the battery pack to be charged. To do this, the battery pack being charge should have the individual cell connector. And connect it to the individual port at the right side of charger. You do not need connect the battery output jack to the output of charger at this program.

In this mode, the charging process will be different from ordinary charging mode. The internal processor of the charge will monitor the voltage of each cell of the battery pack and control the charging current feeding to each cell to normalize the voltage.
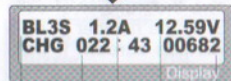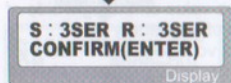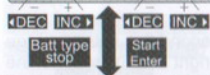
**LiPo CHAGRE**
**2.0a      11.1V(3S)**

◄DEC INC►   ◄DEC INC►

Batt type stop   Start Enter

The value on the left side of second line sets a charge current and the value on the right side of second line set the voltage of the battery pack..

After setting the current and voltage press        key for more than 3 seconds to start the process.
(Charge current: 0.1~0.5A, Voltage: 1~5 series)

**S : 3SER  R : 3SER**
**CONFIRM(ENTER)**

Start Enter

This shows the number of cells you set up and the processor detects. 'R:'shows the number of cells found by the charger and 'S : 'is the number of cells selected by you at the previous screen> if both numbers are identical you can start charging by press        button. If not, press Batt type stop button to go back to previous screen. Ten carefully check the number of cell of the battery pack to charge again.

**BL3S  1.2A  12.59V**
**CHG 022 : 43 00682**

The screen show the present situation during charge process. To stop charging press Batt type stop key once.

number  charging        battery  charged
of      time            voltage  capacity
cells
        charging
        current

You can monitor the present voltage of individual cell by pressing ◄DEC or INC► button during the process.

**4.17V 4.17V  4.19V**
**0.4A 0.00V   0.00V**
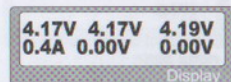
The first line of display shows the voltage of no.1 cell, no.2 cell and no.3 cell from the left. And the left of second line shows the charging current. The next shows the voltage of no.4 and no.5 cell.

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These programs are for charging NiMH(Nickel-Metal-hydride) of NiCd(Nickel-Cadmium) battery commonly used for R/C model applications.
To charge the charging current, press        key to make it blink then change the value using **DEC** or **INC** key. The value will be store by pressing        key once.
To start charging, press        buttton for more than 3 seconds.

```
NiMH CHARGE
CURRENT    2.0A
```
Display
◄DEC INC►
Batt type stop    Start Enter

This program simply charges the battery using the current you set. The charge current ranges from 0.1 to 5.0A.

```
NiMH 2.0A    7.42V
CHG 022:45 00890
```
Display

The screen displays the current state of charging. To stop the process, press **Batt type stop** key once.
The audible sound indicates you the end of process.

battery type | charging time | charging current | battery voltage | charged capacity

This is programmed for charging Pb(lead-acid) battery with nominal voltage from 2 to 12V. Pb batteries are totally different from NiCd or NiMH batteries. They can only deliver relatively lower current compare to their capacity, and similar restrictions definitely apply to charge. So the optimal charge current will be 1/10 of the capacity. Pb batteries must not be charged rapidly. Always follow the instruction is supplied by the manufacturer of battery.

```
Pb CHARGE
4.0A       12.0V
```
Display
◄DEC INC►   ◄DEC INC►
Batt type stop   Start Enter

Set up the charge current on the left and the nominal voltage of the battery on the right. The charge current ranges from 0.1 to 5.0A and the voltage should match with the battery being charged.
Start the charge process by pressing        key for more than 3 seconds.

```
Pb6S 4.0A  12.59V
CHG 022:43 00682
```
Display

The screen displays the state of charging process. To stop charging forcibly, press **Batt type stop** key once.
The audible sound indicates you the end of process.

charging time | charging current | battery voltage | charged capacity

601BC incorporates a various functions of protective and monitoring the system to verify functions and the state of its electronics. In any case of occurring error, the screen displays the cause of error that is self-explanatory with audible sound.

| | |
|---|---|
| **Reversed polarity** <br> Display | The output is connected to a battery with incorrect polarity. |
| **Connection break** <br> Display | This will be displayed in case of detecting an interruption of the connection between battery and output or voluntarily disconnecting the charge lead during the operation of charge or discharge on output. |
| **SHOT ERR** <br> Display | There was a short-circuit at OUTPUT. |
| **IN Voltage ERR** <br> Display | The voltage of input power lowers the limit. |
| **VOL SELECT ERR** <br> Display | The voltage of Lithium battery pack was selected incorrectly. Verify the voltage of battery pack carefully. |
| **BREAK DOWN** <br> Display | There happens malfunction at the unit by any reason. |
| **BATTERY CHECK LOW VOLTAGE** <br> Display | The processor detects the voltage difference during charging. |
| **BATTTERY CHECK OVER VOLTAGE** <br> Display | The processor detects the voltage difference during charging. |
| **BATTTERY VOL ERR** <br> Display | The voltage of one of the cell in the Li-poly battery pack raised over the limit. |

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## Specifications

| | |
|---|---|
| Operating voltage range: | 11.0 ~ 18.0 Volt |
| Circuit power: | max. 50W |
| Charge current range: | 0.1 ~ 5.0A |
| Current drain for balancing Li-po: | 200mAh/cell |
| NiCd/NiMH battery cell count: | 1 ~ 14 cell |
| Li-Ion/Polymer cell count: | 1 ~ 5 series |
| Pb battery voltage: | 2 to 12V |
| Weight: | 350 g |
| Dimensions: | 130 X 90 X 28 mm |