

# CR-2000

## Battery Charger

### Multi Charger CR-2000

### Instruction Manual

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- The contents of this manual are subject to change without prior notice.
- The contents of this manual should be complete, but if you find any errors or omission, please contact us.
- Futaba is not responsible for the results of use of this product by the customer.

Thank you for purchasing a CR-2000.

The CR-2000 is a quick charger for the nickel cadmium and nickel metal hydride battery used in radio control transmitters, receivers, and glow boosters. Since this charger can charge the battery faster than ordinary chargers for home use, that much more care is required. To fully display the performance of the charger and to use the charger safely, please read this instruction manual thoroughly before use.

#### CAUTION

- ❗ Do not leave the side of the CR-2000 during charging. If you sense an abnormality at the charger or battery during charging, immediately stop charging. If the temperature of the battery rises to 60. C or higher, it is extremely dangerous. If the battery suddenly becomes hot, immediately stop charging.
- When a nickel cadmium or nickel metal hydride battery is new or has not been used for a long time, the delta peak, which is the criteria for the end of charging, will be difficult to obtain and may not be detected. If charging is continued, the battery will be overcharged and become abnormally hot and is extremely dangerous.

#### Features of CR-2000

- Nickel cadmium and nickel metal hydride batteries for transmitter, receiver, and glow booster can be charged.
- Auto cut by peak voltage detection
- Transmitter and receiver batteries or transmitter and glow booster batteries can be charged simultaneously.
- The charging current can be changed. Transmitter: 0.5A~2.0A (0.1A steps), receiver: 0.05A~2.0A (0.05A steps), glow booster: 1A~2.5A (0.5A steps)
- The input voltage, output voltage, charging current, peak voltage, charging time, and charging amount can be monitored on an LCD display.

#### Input power supply (parent power supply)

Use a 12V car battery or a power supply having an output capacity of 6A or more at DC11~15V as the input power supply.

#### CR-2000 Ratings

- Input voltage: DC11V~15V (low battery display at 10.5V)
- Corresponding batteries: TX: 500~2,000mAh (6~8 cells)  
RX: 50~2,000mAh (4~6 cells)  
GLOW: 1,000~2,500mAh (1 cell)
- Charging current range: TX: 0.5~2A, RX: 0.05~2A, GLOW: 1~2.5A
- Case size: 151x85x35mm (Excluding projecting parts and cord compartment.)
- Weight: 355g

(Specifications and ratings are subject to change without notice accompanying technical developments.)

#### Description of CR-2000 Parts

##### SELECT dial

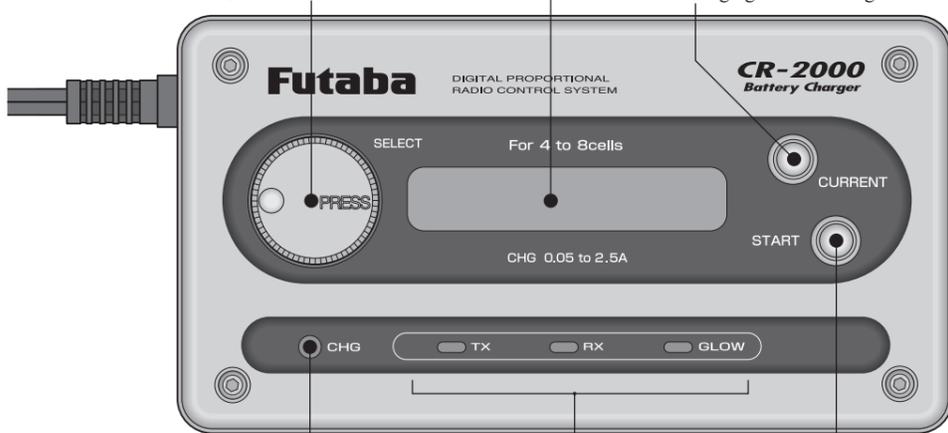
Used to set (at current setting screen) the charging current by setting and to switch the screen display TX/RX/GLOW mode by pressing.

##### LCD display

Displays the charging current setting screen, output data, input voltage, operation mode, and error state.

##### CURRENT button

Calls the charging current setting screen.



**CHG LED display**  
Lights during charging.

**TX/RX/GLOW LED display**  
The output data corresponding to the lit LED is displayed on the LCD display. (TX: Red, RX: Green, GLOW: Orange)

**START button**  
Charging start/stop button

##### TX output connector

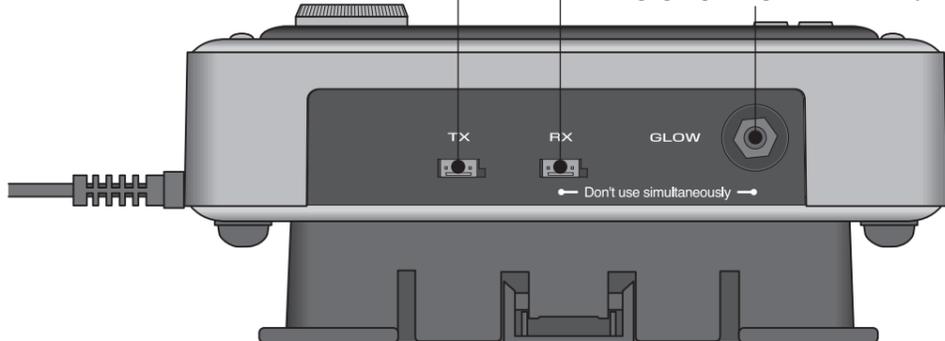
Charging output for transmitter battery.

##### RX output connector

Charging output for receiver battery.

##### GLOW output connector

Charging output for glow booster battery.



- \*TX and RX or TX and GLOW can be charged simultaneously.
- \*RX output and GLOW output cannot be used simultaneously. Only the GLOW side is effective even if a battery is connected to both outputs.

#### Usage precautions

##### WARNING

- ⊘ Do not use the charger near materials that may ignite.
- There is the danger of ignition by sparking when the battery is connected or disconnected.

##### CAUTION

- ⊘ Never charge a battery other than a nickel cadmium or nickel metal hydride battery.
- Charging a noncompliance battery will cause the battery to overheat or give off sparks and is extremely dangerous.
- ⊘ Never connect the battery in reverse.
- Reverse connection will cause the battery to overheat or will damage the inside of the charger.
- ⊘ Do not add an additional charge after charging.
- Auto cut will not function and the battery will overcharge and overheat and is extremely dangerous.
- ⊘ Never get the charger wet.
- The interior of the charger is a precision electronic circuit and the entry of water will cause erroneous operation. If the charger gets wet, always have it repaired.
- ⊘ Do not charge a warm battery.
- The specified charging amount cannot be obtained and the battery performance will not be amply displayed. Charge the battery after it has cooled.
- ⊘ Never charge a battery over its nominal capacity (1C).
- If a battery is charged with a current exceeding 1C, the battery will overheat and deteriorate.
- ⊘ Do not connect two or more battery packs to one output terminal.
- It is extremely dangerous because the battery will short circuit and auto cut will not function normally.
- ⊘ When power is taken from a car, do not operate the car ignition switch during charging.
- Also, do not charge the battery while the car is in motion.
- It will cause input voltage changes and erroneous operation due to vibration, etc. When an abnormality occurs while running, it cannot be coped with and is associated with serious accidents.
- ⊘ Do not perform charging with the charger sitting on vinyl, plastic, or other materials that melt easily or on a car seat or other flammable article.
- The charger will heat up during charging. Also, the battery may also overheat for some reason.
- ⊘ Do not contact the metal parts of a glow booster into other live parts during charging.
- Shorting is extremely dangerous.
- ❗ Avoid places where the charger will be exposed to direct sunlight. Perform charging within the 5~40°C range.
- Normal charging will be impossible and will cause abnormal heating.
- ❗ When charging a new battery or a battery that has not been used for a long time, auto cut may not function. If the battery becomes abnormally hot, stop charging.
- When a nickel cadmium or nickel metal hydride battery is new or has not been used for a long time, the delta peak, which is the criteria for the end of charging, will be difficult to obtain and may not be detected. If charging is continued, the battery will be overcharged and become abnormally hot and is extremely dangerous. When the delta peak is not detected and auto cut does not function, it may be possible to detect the delta peak by discharging and charging the battery 2~3 times using a standard charging current charger.
- ❗ Charge a battery that has been appropriately discharged.
- If a battery is repeatedly charged with a charge remaining, it may not return to its original performance. The criteria for the charge remaining after discharge are 0.9V/cell.
- ❗ Be careful that the cord is not pinched or shorted.
- If the cord is shorted, the battery may heat up and give off sparks.
- ❗ During charging, check the charging amount at the data display screen. When the charging amount becomes extremely large, stop charging.
- Auto cut may not function for some reason.
- ❗ After the end of charging, disconnect the battery from the charger.

#### Meaning of Special Markings

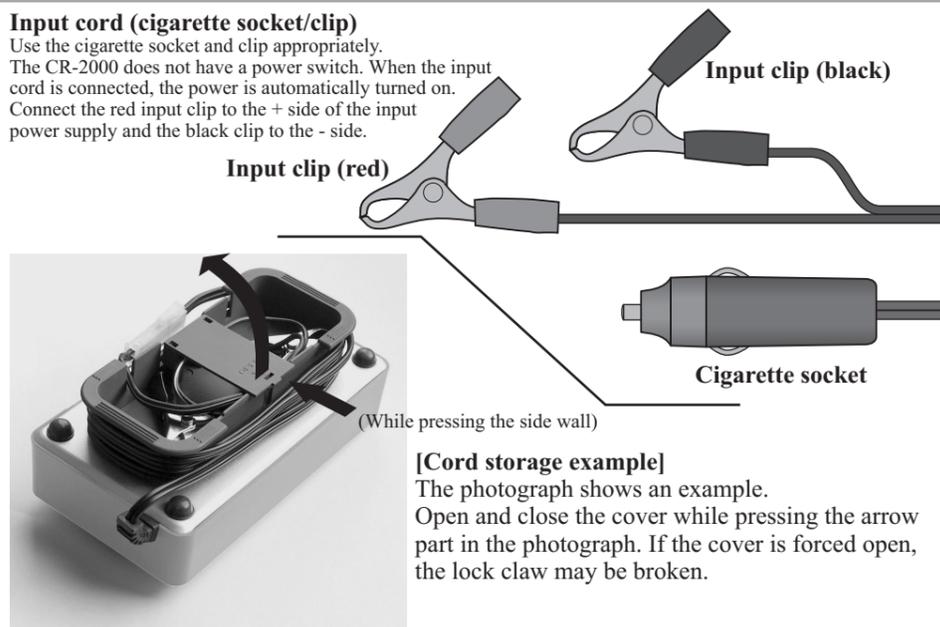
Pay special attention to safety where indicated by the following marks:

- ⚠ **DANGER** Procedures which may lead to dangerous conditions and cause death/serious injury if not carried out properly.
- ⚠ **WARNING** Procedures which may lead to a dangerous condition or cause death or serious injury to the user if not carried out properly, or procedures where the probability of superficial injury or physical damage is high.
- ⚠ **CAUTION** Procedures where the possibility of serious injury to the user is small, but there is a danger of injury, or physical damage, if not carried out properly.

⊘ : Prohibited    ❗ : Mandatory

#### Input cord (cigarette socket/clip)

Use the cigarette socket and clip appropriately. The CR-2000 does not have a power switch. When the input cord is connected, the power is automatically turned on. Connect the red input clip to the + side of the input power supply and the black clip to the - side.



#### [Cord storage example]

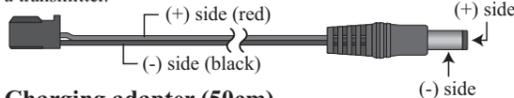
The photograph shows an example. Open and close the cover while pressing the arrow part in the photograph. If the cover is forced open, the lock claw may be broken.

#### [Accessories]

The following charging cords (3 types) are supplied with the CR-2000 set. Use these cords when charging a battery mounted in the fuselage and when charging the battery by connecting the charger to the charging jack of a transmitter.

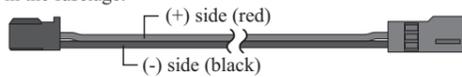
##### TX charging adapter (70cm)

Use when connecting the charger to the charging jack of a transmitter.



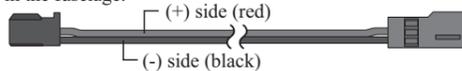
##### Charging adapter (50cm)

Use when connecting the charger to a battery, etc. mounted in the fuselage.



##### Charging adapter (200cm)

Use when connecting the charger to a battery, etc. mounted in the fuselage.



#### CAUTION

- ⊘ Do not use the accessory TX charging adapter (transmitter extension cord) with other makes of transmitter. This extension cord is designed to be used with Futaba transmitters only.
- The polarity (+, -) of the transmitter charging jack may be different.
- ⊘ Do not modify the accessory charging adapter (extension cord).
- If shorted or connected in reverse, the CR-2000 or the battery will be abnormally heated and damaged.

## Charging method

### CAUTION

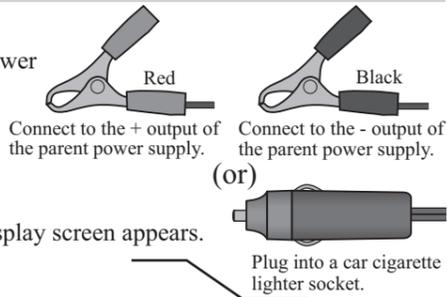
- ❗ Avoid charging where the charger will be exposed to direct sunlight. Perform charging within the 5~40. C range.
- Normal charging will become impossible and will cause abnormal heating.

### 1 Power supply connection

When the input cord is connected to the parent power supply and the power is turned on, the CR-2000 automatically starts.

**Futaba**  
**CR-2000 V\*. \***  
(Displayed for about 2 secs)

\*After the opening screen display, the TX data display screen appears.



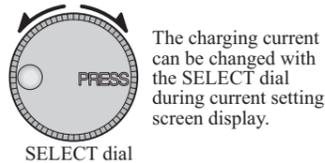
### 2 Battery connection (TX/RX/GLOW)



Connect the charger to the output connector matched to the type of battery to be charged. The corresponding LED in the "TX", "RX", and "GLOW" LEDs lights. The charging current setting screen is also automatically displayed.

"TX", "RX", or "GLOW" is displayed according to the connected connector position.

**SET TX CURRENT**  
**0.50A for 500mAh**  
(Displayed for about 5 secs)  
Current charging current set value



When an over discharged battery was connected, the charger may not be able to detect the battery and the LED lamp will not light. Wait 2~3 minutes in the connected state. If the LED lamp lights, charging is possible. If the LED lamp does not light, try charging with a charger of the standard charging current (0.1C).

Check the charging current at the current setting screen. To change the charging current, turn the SELECT dial while this screen is being displayed. When the CURRENT button is pressed, the current setting screen can be recalled even if it is closed.

(Charging current setting range)  
TX: 0.5A~2.0A (0.1A steps)  
RX: 0.05A~2.0A (0.05A steps)  
GLOW: 1.00A~2.5A (0.5A steps)



### CAUTION

- ❗ Never charge with a current exceeding the nominal capacity (1C) of the charged battery.
- Charging with a current exceeding 1C will cause the battery to abnormally heat up and deteriorate.

The current setting screen closes and the data display screen opens. Each data is displayed during charging.

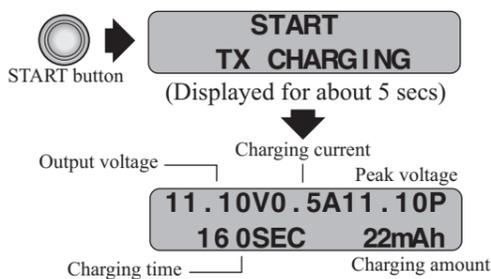
Output voltage: 10.20V0.0A 0.00P  
Charging current: 05EC 0mAh  
Charging time: \_\_\_\_\_ Charging amount

### 3 Starting and ending charging

#### CAUTION

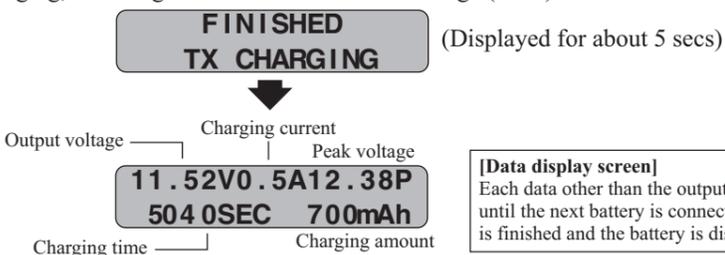
- ❗ Do not leave the side while charging. If you notice an abnormality at the charger or battery during charging, immediately stop charging. If the battery temperature rises to 60°C or higher, it is extremely dangerous. If the battery suddenly becomes hot, immediately stop charging.
- When a nickel cadmium or nickel metal hydride battery is new or has not been used for a long time, the delta peak, which is the criteria for the end of charging, will be difficult to obtain and may not be detected. If charging is continued, the battery will be overcharged and become abnormally hot and is extremely dangerous.
- ❗ When taking power from a car, do not operate the ignition key during charging. Also, do not charge while the car is in motion.
- It will cause input voltage changes and erroneous operation due to vibration, etc. when an abnormality occurs while running, it cannot be coped with and is associated with serious accidents.

When the START button is pressed, charging starts. At this time, the "CHG" LED lights. Also, after the start screen is displayed for about 5 seconds, the display switches to the data display screen and the charging state can be monitored.



**[When starting charging]**  
When a battery is connected, the charger automatically checks the battery. When the START button is pressed immediately after connection, an error may be displayed, depending on the state of the battery. In this case, reset the error display by pressing the CURRENT button. After the data display screen output voltage display rises to about 10V, start charging by pressing the START button.  
Always check the charging current at the current setting screen before starting charging. Set the charging current to the nominal capacity (1C) or less of the battery. For example, for a 600mAh battery set the charging current to 0.6A or less.

When charging is complete, about 5 seconds after an audible alarm (beep beep beep beep, beep beep beep beep, beep beep beep beep) sounds and the finished charging screen appears, the display switches to the data display screen. The "CHG" LED goes off. After the end of charging, the charger switches to the trickle charge (5mA) mode.



**[Data display screen]**  
Each data other than the output voltage is displayed until the next battery is connected even if charging is finished and the battery is disconnected.

### CAUTION

- ❗ At the end of charging, check the peak voltage, charging amount, and other data and that the battery is about body temperature, and then disconnect the battery from the charger.

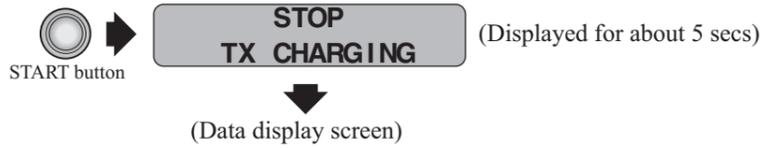
#### [Charging current after auto cut]

After auto cut, the charger automatically switches to a low charging current and continues charging. The charging current value after auto cut varies, depending on the charging current set value.

Charging current set value	0.05-0.45A	0.5-2.5A
Charging current after auto cut	5mA	70mA

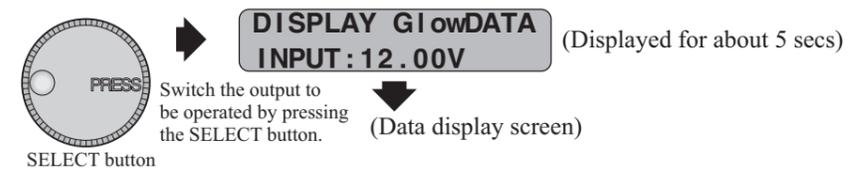
#### (Forced end)

When the START button is pressed when you want to forcibly end charging midway, charging ends. At this time, the display switches to the data display screen about 5 seconds after an audible alarm (beep beep beep beep, beep beep beep beep, beep beep beep beep) sounds and the forced end screen appears. The "CHG" LED goes off.



#### (Data display and charging operation output switching)

Normally, when a battery is connected, its output data is automatically displayed and the charging operation by button becomes possible. However, when connecting batteries to the two outputs simultaneously, you may want to switch the output that is operated. In this case, switch the output by pressing the SELECT button. Each time the SELECT button is pressed, the output is switched in TX->RX->GLOW->TX--- order.

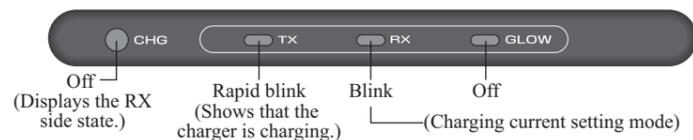


#### LED display for 2 outputs simultaneous connection

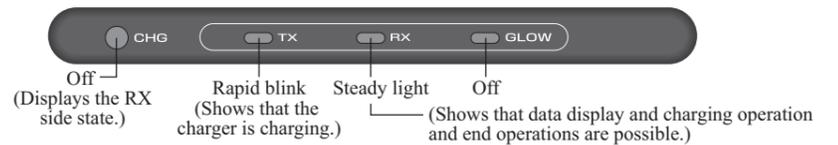
When charging 2 outputs simultaneously, part of the LED of the "Charging Method" item at the left may be different. Perform charging by referring to the display example shown below.

#### [Connection example]

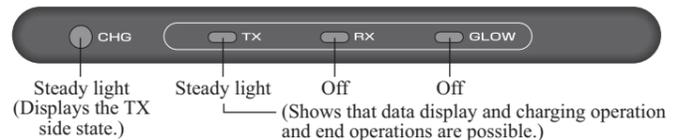
When a receiver battery was connected while charging a transmitter battery, the LEDs are displayed as shown below and the charger enters the receiver battery side charging current setting mode.



When a charging current setting mode was finished, the LEDs are displayed as shown below and the receiver battery side data display and charging start and end operations are possible.



When the screen display mode was switched to the "TX" side by pressing the SELECT button twice, the LEDs are displayed as shown below and the transmitter battery side data display and charging start and end operations are possible.



#### Error display, etc.

##### [When battery disconnected while charging]

When the battery is disconnected while charging, an audible alarm sounds and the error message shown at the right appears. The "CHG" LED goes off.

**NO CONNECT TX BATTERY**

##### [When input voltage dropped]

When the input voltage dropped, the error message shown at the right appears. Check the parent power supply.

**Error: INPUT LOW BATTERY**

##### [When output side shorted]

When the output side of the charger is shorted, the error message shown at the right appears. Remove the short circuit.

**Error: OUTPUT SHORT OR REVERSE**

##### [When output voltage rose abnormally]

When the output voltage of the charger rose abnormally, charging is forcibly ended and the error message shown at the right is displayed. Check the battery.

**Error: OUTPUT HIGH PEAK**

#### <When requesting repair>

Before requesting repair, read this instruction manual again and check the charger. When there is an abnormality, request repair to your local Futaba dealer.

#### <Recycling nickel batteries>

Used nickel batteries are a valuable resource. Tape or otherwise process the terminals so that are not shorted and take the used battery to your local recycling center.