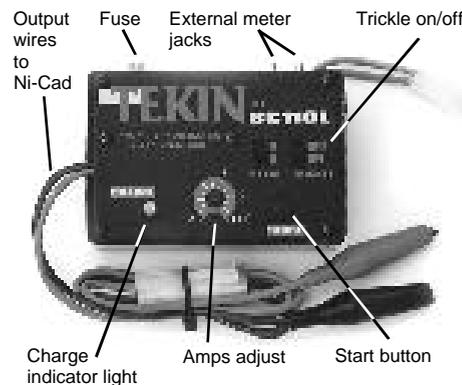


**TEKIN**  
Championship Electronics

**BC110L**  
**BC5A**  
OPERATION MANUAL



**FEATURES**

- .5-10 AMP adjustable linear output current. (.5-6.5 amps on BC5A)
- High performance linear current output.
- Fully automatic Peak Detection operation.
- Works with a variety of power supplies.
- Compact, lightweight construction.
- Precision components and calibrated dial for accurate current adjustments.
- External Volt/Ammeter jacks.
- New 33Khz digital switching circuitry for cool operation and high performance.
- Easy one-button operation.

**POWER SUPPLY**

A) DC Charging 4-8 cell packs: Best results are obtained by using a 12 volt automotive battery or a regulated supply as the power source. A 4-10 amp automotive battery charger may also be used, but may sometimes cause unsatisfactory results due to voltage spikes and dropouts. When using a 12 volt battery while it is installed in an automobile, be very careful not to let the metal panel on the charger touch any grounded metal parts on the vehicle. This will cause a short to occur and will blow the fuse. If you are using a regulated power supply, it should have a current rating of at least the amount of amps at which you wish to charge.

**CAUTION:** If you use a lead-acid (automotive) battery as the power source, make sure you have good ventilation. Lead-acid batteries give off explosive hydrogen gas when they are being charged. Lead-acid batteries should not be charged while a Tekin charger is also connected to them.

B) Connection: Once you have selected a suitable power source, connect the large RED Positive (+) clip of the charger to the POS (+) terminal of the power source, and the BLACK Negative (-) clip to the NEG (-) terminal of the power source.

C) AC Charging from a household current (BC5A only): The BC5A has a built-in 6.5 amp AC power supply which will charge 6-7 Ni-Cad cells to a full peak at up to 6.5 amps. The BC5A uses linear charge output. 4 or 5 cells can be charged at up to 6.5 amps. 8 cells can be charged at up to 3 amps. To use, plug the AC power cord from the charger into any suitable outlet. The standard voltage is 120 volts for the USA. Be sure to keep soldering irons and sharp objects away from the power cord.

**WARNING:** This appliance is not a toy! Improper use of this or any other AC powered device can be hazardous. Do not operate or plug in the unit near water or moisture. For indoor use only, except under controlled outdoor conditions. Always unplug the charger when not in use. A charger on which the AC power cord has become frayed, worn, burned, or damaged in any way, should be immediately unplugged safely from the AC outlet and not used until it can be properly serviced. Do not attempt to open or repair the charger yourself. Never insert objects into the cooling vents on the charger.

**FUSE**

If an overload occurs or improper connection is made, the fuse will blow. In this case, disconnect the power and remove the fuse by pulling it straight out. Then replace it with a 15 - 20 amp automotive plug-in fuse. Do not use a fuse rated higher than 20 amps, or damage to the charger could result.

**INDICATOR LIGHT**

The LED indicator light will glow brightly during a fast charge. When fast charge is done, the light will go out.

**TRICKLE ON/OFF SWITCH**

Turns Trickle or Slow Charge ON or OFF. The trickle charge current adjusts in proportion to the fast charge current, from about 10 - 200MA. If the cells have not recently been fully discharged (with a discharge resistor or other device) then turn Trickle mode ON to equalize, top off, and balance the battery pack. Trickle mode is also useful to achieve maximum run time, but with some power loss.

If you fully discharged the batter recently, turn the trickle switch to "OFF" for maximum power, and use a re-peak process to top off the battery pack.

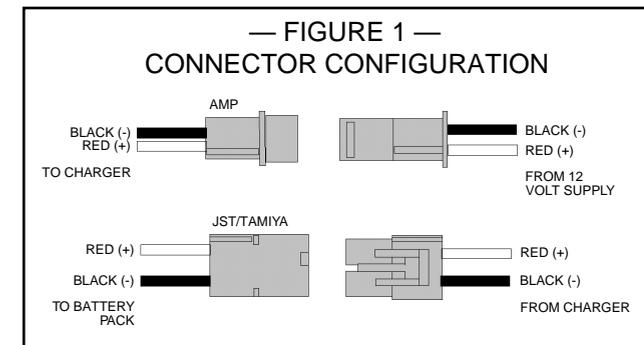
The light does not blink while trickle charging. You may verify trickle charge operation by turning the trickle charge switch to off,

then back on. When the switch is first turned on, the light will come on momentarily if everything is hooked up and working correctly.

If you are fast charging and you wish to go to trickle charge, you may do so by unplugging the battery pack for about 5 seconds, then plugging it back in.

**CONNECTING THE NI-CAD BATTERY PACK**

The charger comes equipped with Tamiya / JST style plugs, which fit most battery packs. An alligator clip adapter is also included. If you use other than JST plugs, you may wish to make an adapter. If you use the alligator clips, you should solder some stub wire leads onto the battery pack and clip onto them. The alligator clips should be clipped onto soft, multi-strand wire to assure good connections are made. A poor connection can cause the charger to "false peak" and turn off before the charge is completed.



**SELECTING THE CHARGE AMPERAGE**

A) Charge Capacity: Most Ni-Cad batteries can be fast charged at 2 to 3 times their rated hourly capacity without adverse effects. Charging Ni-Cads at more than 3 times the rated capacity with the BC5A or BC-11-L is NOT recommended, unless you are just momentarily peaking the batteries.

Ni-Cad batteries are usually rated for capacity in milliamp hours (MAh). A milliamp is 1/1000th of an amp. A 1700 MAh battery should be charged at 3400 (1700 x 2) to 5100 (1700 x 3) milliamps, which is equal to 3.4 to 5.1 amps. A 1200 MAh cell would be charged at 2.4 - 3.6 amps. Charging at the higher end of the range will give the most dependable peak detection.

The lowest capacity cell that the BC110L can charge is 100 milliamp hours. Do not fast charge 50 MAh micro packs, these require a Tekin digital type charger set to .2 amps.

B) Cell Types: There are many different cell types on the market. Some cells, such as SCRC (black) deliver maximum run time but are more sensitive in their charge procedure requirements. If they were just run, always let these cells cool before fast charging. These cells should be discharged fully at least once every 2 - 3 runs. Never charge them at more than 3 times the rated capacity, except possibly just for a few minutes before running, to get an initial surge of power. Other cell types, such as SCR (red) can withstand charging at higher amperage. You can charge these safely at up to 4 times the rated capacity, without significantly reducing the cell's life. With this method, you may get slightly more power, but less run time. Your dealer can help you determine the best way to charge the cells you have.

## START BUTTON

For normal peak charging. Pressing the start button begins the fast charge. The light will come on solid to indicate that a fast charge is occurring, and that current is flowing.

## VOLTS/AMPS SWITCH and METER JACKS

The charger has jacks on the back so you can connect an external digital voltmeter to monitor the charge. Set the meter to the 20 volt DC range. When the charger's selector switch is set to volts, the meter will display the voltage of the battery pack. When set to amps, the display shows the charge amps divided by 30. (.10 volts = 3 amps.) To obtain the correct amperage figure, multiply the reading by 30. The dial of the BC110L is calibrated, and high accuracy precision electronics are used inside, so you can use the markings on the dial for accurately setting amperage.

## CHARGING FOR COMPETITION USE

A) Discharging: If you wish to get the best possible performance out of your batteries, you will need to first discharge the pack before charging. Fully discharging cells is one of the most effective ways to prevent memory, power loss, and capacity loss. With P-170, SCE, and SCRC cells, this should always be done. The pack should first be run down in the car by normal use, then do one of the following:

- 1) Place an approximately 30 ohm, 10 watt resistor across the battery pack. The resistor will cool off in about 30 minutes when the cells fully discharge. It can then be removed and the pack allowed to rest, preferably for at least 24 hours before charging.
- 2) Place a single 1 ohm 5 watt resistor across each individual cell. This method is slightly better, as each cell then gets discharged

independently of the others, thereby assuring a fully matched discharge. These resistors are available as accessories at better hobby shops.

Note: You may notice the charger shutting off prematurely (false peaking) when charging discharged cells. This is because the cell voltage will go down for the first few minutes of charging (the same as a peak), which shuts the charger off. To finish the charge, you can restart the charger by pressing the START button if the cells are not warm.

B) Charging: For best performance and battery life, always let the cells cool before beginning a fast charge. If you have just run the car, let the cells cool for about an hour before recharging. This is critical for performance and cell life, because Ni-Cad cells do not accept a full charge at temperatures over 80 degrees Fahrenheit. After charging the cells, let them rest. This usually takes about 20 minutes. You may then peak charge (re-peak) them until they are slightly warm to the touch. Let them cool fully again, then re-peak them again at a slightly higher amperage, if desired, until they are warm. They will then be ready to run.

## PRECAUTIONS

- a) The panel may become slightly warm in operation, this is normal.
- b) Output adapter cables should be no more than 7 inches longer than the original cables.
- c) The metal panel is electrically live, and should not touch any wires, batteries, or grounded automobile parts. This will cause a short to occur and blow the fuse.
- d) Do not use a fuse rated higher than 20 amps, or the charger can be damaged.
- e) Keep at least 3 feet (1 meter) away from any operating transmitters to avoid erratic operation.

New Battery Warning: Brand new battery packs may exhibit unusual voltage characteristics the first time they are fast charged. There may be erratic voltage, and no peak causing the charger to overcharge the batteries. For this reason, you should manually monitor the battery for the first charge. If the battery becomes excessively warm, take it off the charger.

## TROUBLESHOOTING

- Most problems can be traced to poor or loose connections that trip the peak detector when the wires are bumped or moved. Make certain the charger wires are tightly connected to the battery pack. Any connectors should be clean (use motor spray) and tight. Alligator clips are best clipped to a piece of multi-strand flexible wire so the teeth can sink in.

- A 12 volt battery is the best overall power supply. When using a 12 volt car battery charger or AC power supply sometimes line surges or dropouts will cause problems.
- If the unit slow charges, but will not fast charge when you press the start button, the output wires may be shorted or hooked up in reverse.
- Be careful not to hook up the charger backwards as the fuse may blow. You can replace the fuse yourself with a 15 - 20 amp unit.
- If the power supply, battery, fuse, and all connections all check out okay and the charger either stays on or off all the time, or blows fuses, then the MOSFET inside the charger may have been damaged. This can happen if the unit is shorted, overheated or connected to an improper power supply. If you wish, you may replace the transistor yourself (Part #854).
- If it should ever be necessary to return the unit to factory for repair, be sure to enclose a note stating the nature of the problem, your return address, shipping instructions, and any other special instructions. Most repairs are completed and shipped within 3 days, C.O.D. Please allow up to 2 weeks for shipping.

## — LIMITED WARRANTY —

TEKIN ELECTRONICS, INC. guarantees this battery charger to be free from factory defects in materials and workmanship for 120 days from the date of purchase, verified by sales receipt. This warranty does not cover: suitability for specific application; components worn by use; application of reverse or improper voltage; tampering; misuse, or shipping. Our warranty liability shall be limited to repairing unit to our original specifications. Because we have no control over the installation or use of this product, in no case shall our liability exceed the original cost of the product. By the act of using this battery charger the user accepts all resulting liability. Batteries and other equipment damaged in connection with the use of this device are not covered. We reserve the right to modify the provisions of this warranty without notice.

*Team*  
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