

## BC 210 PEAK DETECTION CHARGER WITH PROFLEX CIRCUIT

### INTRODUCTION

Proflex is the name for a battery charging process where the charge current is occasionally interrupted momentarily and a short negative current (discharge) pulse is applied to the pack. The short reverse pulse acts to break up crystal formations in the cell, and help maintain optimum gas and chemical balance. The result is similar to what happens when you discharge a battery fully and let it rest for a few days.

### FEATURES

- \* Low level output for SCE cells, high level pulses for SCR and reapeaking, and proflex conditioning pulses, all switch selectable.
- \* Adjustable output current 1-9 amps.
- \* May be used with a wide variety of power sources: 12-volt battery, 12-volt car battery charger, or a power supply.
- \* Timer mode to bring up dead batteries and for reapeaking the pack without shutting off.
- \* Double deck circuit boards maintain compact size, and is easy to bring to track.

### CONTROLS

- \* Indicator Light, large: blinks slowly when both batteries are hooked up and slow charging. Comes on solid and bright when charger is fast charging.
- \* Start Button, peak mode: starts the fast charge sequence. This button must be held for 5 seconds to clear the charger's memory. If the nickel cadmium battery is hooked up backwards, the charger will slow charge, but will not fast charge, when this button is pushed.
- \* Star button, timer mode: Activates the fast charge for a fixed 4 minutes, and then shuts off. Used to put an initial charge into dead batteries, and to warm cells up when fully charged.
- \* Indicator Light, small: comes on when the timer mode has been selected. the timer mode continues for 4 minutes unless both batteries are unhooked from the charger momentarily.
- \* Amps Adjust Knob: Used to set fast charge amps from 1 to 9. Has two scales: 1-4.5 and 2-9 amps, depending on the position of the cell selector switch. The slow charge current varies with the position of this pot, too, and is about 1/25 the fast rate.
- \* Cell Selector Switch: Used to select amp range and cell type when charging. When switch is down you have 1-4.5 amps, when up you have 2-9 amps.
- \* Output Jacks: Allow connection of inexpensive external voltmeter to check output voltage and charge rate, used with Volt/Amps switch. Set the voltmeter to the 20V scale. When measuring voltage read directly. When measuring amperage multiply the reading on the voltmeter to the 20V scale. When measuring voltage read directly. When measuring amperage, multiply the reading on the voltmeter by 10 if on the 1-4.5 amp range, and 20 if on the 2-9 amp range. .30 volts=3.0 amps if on the SCE setting, and 6.0 amps if on the SCR setting. In the proflex mode the reading may move around a bit from the reverse pulses.
- \* Fuse: 15 amp automotive type fuse provides protection against reversed power supply voltage. Always be careful when hooking up the 12-volt power source. Never use a fuse rated higher than 15 amps, or damage could occur.

### POWER SUPPLY

For Charging 6 to 8 Cell Packs: A 12-volt automotive battery is recommended. If charging 7-8 cells it is recommended to connect a 12-volt battery charger to the 12-volt battery while charging to maintain the highest supply voltage. A 4-10 amp. automotive battery charger may also be used, but sometimes causes problems due to voltage spikes or dropouts. If the 12-volt battery is installed in an automobile, be careful not to let the wires or heatsink on the top of the charger short to the auto ground or the fuse may blow. CB or homemade power supplies may be ok as long as they do not put out over 14.5 volts under load, and do not put out at least 3 amps or whatever current you wish to charge at. For charging 4 to 5 Cell Packs: You must use the dropping resistor supplied (see drawing on back), otherwise the charger can overheat. Connect into the POS (red) wire.

### COMPETITION BATTERY CHARGING

- \*\*\* First of all, start off with a totally discharged battery pack. This is best accomplished by placing a 30 ohm resistor on the entire pack and leaving it on overnight. 1 week is best.
- \*\*\* When charging a battery that has been totally discharged, it is best to put on the charger and let it trickle charge 15-20 minutes before fast charging. Fast charging totally dead SCE cells is bad for them.

\*\*\* For SCE (1700 mah) type cells - First charge the battery at the 4 amp rate until it peaks out. use the 4.5 SCE setting. The leave the pack on the slow rate for 2 hours. This will add an extra 15-30 seconds running time. 15 minutes before the race disconnect the pack and let it cool. On SCE type cells a 2-step charge is best. The pack is initially charged at the 4 amp soft pulse setting to get maximum capacity. It should then be recharged at least twice at the 9 amps after a few minutes rest.

\*\*\* For SCR type cells - charge at the 4 amp rate then disconnect cells after pack peaks out.

\*\*\* When the charger is done fast charging it will go to the slow charge mode. The slow charge current is 1/20th the fast charge current. If you are fast charging at 4 amps the slow rate would be 200 ma. If you are fast charging at over 5 amps the charger should be disconnected within 1 hour of fast charge shut off, to prevent excessive slow charging. When charging SCR cells no slow charging is necessary.

\*\*\* About 5 minutes before the race put the pack back on the 8 amp rate. Recharge it once or twice until the cells are very warm. This will extract the maximum voltage and capacity from the cell. Run once and then place the 30 ohm resistor back on for at least 24 hours.

## TROUBLESHOOTING

Almost all problems are caused by poor or loose connections that trip the peak detector when the wires are bumped or moved. You must make certain the charger is well 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 source. When using a 12-volt car battery charger or power supply sometimes line surges or dropouts will cause problems.

If the unit slow charges, but will now fast charge when the button is pressed, the output wires may be shorted or hooked up backwards.

Be very careful not to hook up the charger backwards as the fuse may blow. You can replace the fuse yourself with a 15-amp unit.

If the power supply, battery, fuse, and all connections all check out ok, and the charger either stays on or off all the time or blows fuses, then the mosfet transistors inside of 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 unit to factory for repair, be sure to enclose a note stating nature of problem, return address, shipping instructions and any special instructions. Most repairs are shipped back out within 2 days, C.O.D. Please allow up to 2 weeks for shipping.

If the heatsink on the top of the charger becomes excessively warm, then reduce the charge current slightly, reduce the power supply voltage, or use a small fan on the heatsink.

## WARRANTY

TEKIN ELECTRONICS, INC. guarantees this battery charger to be free from factory defects in materials and workmanship for a period of 120 days from date of purchase, verified by sales receipt. This warranty does not cover: suitability for specific application, components worn by use, application or 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 the 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. Thank You, and Good Racing!

## FAST CHARGING

\*\*\* First connect the charge to the power supply. The 12-volt supply should always be connected first and disconnected last. Be sure to check polarity, red clip is pos. (+), and black clip is neg. (-).

\*\*\* Connect charger to the battery pack: be sure to observe polarity.

\*\*\* Push the start button and hold for at least 5 seconds to clear the charger's memory. The light should begin glowing solid or flickering just a little, indicating a fast charge.

\*\*\* Charge current can be adjusted by turning the knob. 1200mah sub-C type cells should be charged at 4-4.5 amps. 1700 mah sub-C type cells should be charged at 3.5-4 amps. SCR type cells should be charged at 8 amps if it's a 6-7 cell pack, otherwise 5.5 amps on 4 cell. 500mah AA type cells should be charged at 1 amp.

(CAUTION: Not all transmitter batteries can be fast charged. It is best to check the battery for excessive warmth while charging.) When charging transmitter batteries, it's best to make an adaptor and connect the nicad pack directly without going through the charge jack on the transmitter.

\*\*\* When the batteries are done the light will begin blinking slowly to indicate a slow 100-350 ma charge rate. The slow rate will be proportional to the fast rate.

\*\*\* If you are charging a pack that has just been completely discharged, the unit may shut off in the first 3 minutes of charging. This is due to false peak of the batteries and not a charger problem. Just press the button to resume charging, or use the timer mode to put some charge into the battery, and then use the peak mode.

#### PRECAUTIONS

\*\*\* The heatsink will become warm in operation, use caution.

\*\*\* Adaptor wires for the output should be no more than 7 inches long and made of silicone battery pack wire (18 gauge or larger). If you use alligator clips they should be insulated, and one lead should be 2 inches longer than the other to help prevent shorts.

\*\*\* The heatsink is electrically live (hot) and must not be allowed to short out any wires or the automobile ground, or the fuse may blow.

\*\*\* DO NOT use a fuse rated higher than 15 amps. If you do and the charger is hooked up backwards, damage WILL result. (Replacement part #853)

\*\*\* DO NOT connect an electric motor to the charger or the MOSFET transistor will be damaged.

\*\*\* A good indication that the battery is fully fast charged is that it will become slightly warm.

\*\*\* Stay at least 4 feet away from where the transmitters are being operated, as they can false trip the peak detector.

\*\*\* **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. This can cause the charger to overcharge the batteries. For this reason you should manually monitor the battery the first charge, and take it off charge if it becomes excessively hot.

#### USING THE PROFLEX PULSES:

The Proflex Pulse will help to restore lost power and run time to odd cells. To do so the pack should be charged all the way up with the proflex turned on. The pack should be discharged, and stored with a 30 ohm resistor across the pack. The pack is then ready to use. If the cells are real old, then 2 full proflex charges may give more improvement.

If the pack is very new, then you should not use the proflex at all as there will be no gain.

If the pack has a medium amount of use, then charge normally, with the proflex off, until the batteries peak. Then, giving the pack one re-peak with the proflex on will give good results. If doing this then be sure to always re-peak once again with the proflex turned off before racing. This will keep the cells in good condition.

Every 5-10 charges the pack may be charged all the way with proflex in order to "clean" the cells out.

If practicing or racing with the same battery all day, then leave the proflex turned on for the whole charge. This is the best way to recharge the cells when not letting them rest. There will be a little, but minimal, loss of power and run time.

Remember to always re-peak with the proflex off after using the proflex.

#### OTHER INFORMATION:

\* Proflex charging works good if you want to use just one battery for the day, either for practice or fun racing. In this case, charge all the way with proflex and re-peak with proflex off. \* Because the proflex is so gentle on the cells, it is great for charging transmitter packs, and other batteries not normally designed for real fast charging. It is best to hook right to the transmitter pack. If you go through the charge jack on the transmitter the wiring inside the transmitter may not handle the current. Charge at 1-1.5 amps.

\* If you listen closely you may hear a ticking (and a buzzing) sound coming from the battery pack while charging in the proflex mode. This is normal.

\* When batteries are new and in good conditions they peak out at a lower voltage than when they are old. When charging batteries in the proflex mode they will peak out at a lower voltage. This is normal. After charging with proflex, you must always re-peak at least once with the proflex off and the cell selector switch set to SCR. Re-peak at 4 amps, or if this is the last re-peak before racing re-peak a 8-9 amps. If you use a pack that has been proflex charged without a proper re-peak you will get reduced voltage.

\* When the cell selector switch is set to SCR and proflex is on, the proflex action is less than in the SCE setting.

\* Always try to have the battery pack between 65 and 80 degrees F when charging. If it is more than 80 degrees F outside then cooling the battery while charging will result in more run time.