

Schumacher CCD20

Charger - Cycler - Discharger

INTRODUCTION

Power Supply

The Schumacher CCD20 is designed to work on a 12-volt power supply. This supply can be an automobile type battery or a stabilised mains power supply that meets the following requirements: The voltage must be well smoothed and between 11 and 16 volts. The continuous current rating must equal the charge current required.

Nicad Pack Connections

Carefully solder and insulate your preferred nicad connectors to the CCD20 nicad wires. Be very careful that the connectors are well insulated and cannot be shorted together (see Hints and Tips).

Getting Started

Connect the red and black crocodile clips to the 12-volt power source, red to (+) and black to (-). The display will show "0000" if the connections are correct.

Warning!

Reversed connections on either power in or nicad will blow an internal fuse (see Fuse Replacement).

CHARGE

To begin a charge, simply connect a nicad and press the CHARGE button. The charge LED will come ON, the amp meter will show the charge current and the display will show the charge time in seconds.

Charge Current Adjustment

The charging current should be set within the first 100 seconds of the charge. Adjustments after this period can trigger the peak detector and stop the charge. Adjust the AMPS control until the required charge is shown on the amp meter (clockwise rotation increases the current).

Short Circuit Check

During the first two seconds the CCD20 checks the nicad for a short circuit. If detected, the charge will be stopped, the LED switched OFF and the display reset to "0000". If the check is passed, the LED will fast flash indicating a fast charge.

Defective Cell Check

The nicad voltage should always be above 6 volts after the first 10 seconds of charging. Failure to reach this voltage indicates defective cells in the nicad. The CCD20 will detect this and stop the charge when the display shows "0010". The nicad must be removed to continue. If the nicad passes this check, charging will continue until the delta peak is detected and fast charge is automatically stopped. The display shows the number of seconds the nicad has been charging.

N.B.:

Every second during a charge the amp meter will be seen to dip, the discharge LED blink and the nicad may make a clicking noise. This is normal (see Bubble Charging).

Near the end of a charge, the charge current may drop. This happens if the difference between the on-charge voltage of nicad and power supply is not great enough, for example the nicad is old or the input volts are low.

Charge Over

When the delta peak is detected, the charge is stopped, the display will show how long the nicad was charging and the LED will slow flash to indicate top-up mode.

Top-Up Mode

To keep the nicad in perfect condition ready for racing, the CCD20 fast charges for 1 second every 45 seconds shown as a pulse on the amp meter. This continues for as long as the nicad is connected (see Bubble Charging).

Pressing the CHARGE button will continue the charge (boost).

Pressing the DISCHARGE button will start a discharge.

DISCHARGE

Heat Warning

The heat sink will become hot during a discharge. Do not touch the heat sink, do not use the CCD20 on a polished wood or heat sensitive surface.

Discharging

To begin a discharge, connect a nicad and press the DISCHARGE button. The LED will flash and if the nicad voltage is above 4.8 volts the display will count. The discharge will stop when the nicad voltage drops below 4.8 volts. The display stops counting and the led stays ON.

Display Information

The display shows the nicad capacity in 0.1 seconds X 20 amps.

For example 3096 = 309.6 seconds at 20 amps.

If required, the AmpHrs capacity can be calculated by dividing by 1800.

For example $3096 / 1800 = 1.72$ AmpHrs.

Total Discharge

Pressing the DISCHARGE button a second time will begin a total discharge. The LED will flash while the nicad is discharging. When the nicad voltage drops below 0.5 volts, the LED is turned OFF and the display resets to zero. Pressing the CHARGE button will start a charge. Do not charge a hot nicad.

N.B.:

It is normal for the count rate to vary during a discharge.

During discharge the nicad may make a clicking noise.

CYCLE

A cycle begins with a discharge. The nicad is then charged and discharged (to 4.8 volts) the programmed number of times.

Set charge current. Connect a nicad and press CHARGE. Adjust the charge current to that required for a cycle charge. When set, disconnect the nicad to stop the charge.

To start cycle, press CYCLE (both buttons at the same time). Both LEDs will come ON and the display will read "0001" (the minimum number of cycles).

Use the "+1" button to increase the number of cycles required. If a mistake is made, release the button then press and hold it in. The display will increase then reset to "0001" after 2 seconds.

Connect a nicad and press the GO button to start, the CCD20 always starts with a discharge.

N.B.: To indicate that the CCD20 is in cycle mode:

During discharge: the DISCHARGE LED will flash and the CHARGE LED will be ON.

During charge: the CHARGE LED will flash and the DISCHARGE LED will be ON.

During cool down: both LEDs will flash.

Cool Down

In the cycle mode all charges and discharges are followed by a waiting period to allow the nicad to cool down.

Charge wait

After a charge, display is reset to "0000" and the CCD20 waits for two minutes.

Discharge wait

After a discharge the display shows the nicad capacity and the CCD20 waits for the same amount of time that the nicad was in the discharge mode.

Cycle over

When the CCD20 has charged and discharged the nicad the programmed number of times, the CHARGE LED will be OFF and the DISCHARGE LED will be ON. The display will show the last discharge capacity. The nicad will be discharged to 4.8 volt. Pressing the DISCHARGE button will start a total discharge.

FUSE REPLACEMENT

The CCD20 is protected by two internal fuses. Both are 20mm 10A anti-surge (slow blow), Schumacher Part No. G647D. If the CCD20 fails to come on (display "0000") or there is no charge or discharge, check the fuses as follows:

Without the power or nicad connected remove the four screws on the bottom of the CCD20 and separate the case.

Inspect the two fuses.

If blown (wire inside missing or broken), carefully replace. Check fuse holder is tight.

Replace the case and screws, do not over-tighten.

Check for correct operation.

N.B.: Repeated fuse failure indicates a faulty CCD20. Return for repair.

Blown Fuse Symptoms

Connect 12-volt supply, do not connect nicad

No display = Blown left side fuse

Display on "0000": connect nicads. Press CHARGE: LED ON, no amps, display to 1 then reset = Blown centre fuse

FLEX OR BUBBLE CHARGING NOTES

Bubble charging is a method of charging nicads that uses one second periods of charge followed by a short duration high current discharge pulse. This charge / discharge pulse is repeated until the nicad is charged. Trials have shown the following advantages of this type of charging:

Removes "memory" effects.

Restores lost capacity.

Improves charge efficiency.

Increases nicad life.

During a charge the chemical reaction within a cell produces oxygen bubbles. These bubbles accumulate on the cell plates lowering the charge efficiency by reducing the effective plate area. The main purpose of the discharge pulse is to strip away these bubbles, reducing the cell's internal pressure, temperature and impedance, allowing the applied charge to be turned into stored energy instead of gas and heat. Increasing the charge efficiency in this way allows all-day re-charging of the same nicad without the normal drop in capacity.

HINTS AND TIPS

Always keep your nicads, insulation and connectors in perfect condition. This will reduce the risk of accidents and improve performance.

Most problems are caused by a poor power supply.

Premature cut-out on charge can be caused by poor smoothing on a mains power supply.

Discharging a nicad at the end of a race will show the remaining capacity. Use this figure to find the pinion size that can be fitted and still finish the race.

Cycle new packs at least five times. Do not charge a hot nicad. Do not charge dry cells.

Do not get the CCD20 wet. Clean with a soft damp cloth.

Do not reverse connect the supply volts or nicad connections. Either will blow an internal fuse.

Do not remove the supply leads with a nicad connected. This may blow an internal fuse.

GUARANTEE AND SERVICE

Blown fuses, flat or defective 12-volt battery or poor connections cause most problems. Check both fuses and try your CCD20 on a different 12-volt battery and nicad before returning for repair. Allow 14 days for repair. Include as much information about the fault condition as possible. This will ensure a quicker and cheaper repair. Guarantee is valid for faulty parts and workmanship for 90 days from date of purchase. These conditions do not affect your statutory rights.