Schumacher CCD2000
Charger – Cycler - Discharger

Instructions

Congratulations on the purchase of your CCD2000 (Charge, Cycle, Discharge) cell management system. The CCD uses the latest technology to achieve a system with all the features needed to keep your cells in top condition. CCD has been developed over a long period and is manufactured using the highest possible standards. To achieve maximum benefit from your CCD please read the instructions carefully before use.

Quick Start

Connect 12 volt power supply. Connect cells. Press **Charge** and set charge current or press **Discharge.** Charger will automatically cut-off when cells are fully charged. To **Cycle** press charge and **Discharge** at the same time, press **+1** to set number of cycles, then **GO.**
Full Data is displayed after completion.

Power Supply

The Schumacher CCD is designed to work on a 12 volt power supply. This can be an automobile type battery or a stabilised mains power supply that meets the following requirements:-

1) The voltage must be well smoothed between 12 and 12 volts.
2) The continuous current rating Must be equal to the charge current required.

Cells

The CCD 2000 will charge from 1 to 7 cells at from 1 to 8 amps. **Check the cell manufacturers charging rates.** If charging a single cell max charge is 2 amps, 4 cells max charge is 4 amps and 6 or 7 cells max charge 8 amps. Due to the lack voltage difference between the cells and power supply not all 6 & 7 cell packs will go upto the full 8 amps. Do not recharge drycells.

Power On

1)Connect the Red and Black to the 12 volt power source. RED to POSITIVE (+), BLACK to NEGATIVE (-).
2)Display will show **tESt** for approx. one second.

Flex Option

To select FLEX charge press and hold the CHARGE button as the power source is connected.
The FLEX charge system is a linear charge current with regular short discharge pulses. These discharge or FLEX pulses help to remove bubbles from the cells internal battery plates to allow a fuller more complete charge. The FLEX pulses can also break down crystal growth inside the cell giving longer life with more performance. Older cells benefit most from FLEX charging, especially in the last two minutes of the race. FLEX charging also allows the cells to be used more often in a day.

If the display shows **tESt** continuously and power supply is being used, slowly reduce the charge current until **tESt** changes. This current setting will be the highest possible on that power supply.

Discharge Data

The display shows:-

Dt=,340, Ah=,1.89, Pf=,84.2 (example)

Where:-
Dt = is the 20 amp equivalent discharge time in seconds.
Ah= is the cells capacity in amp hours.
Pf= is the 'Punch Factor' as a percentage.
Punch Factor is calculated by comparing the on-load voltage with the off-load voltage and is an indication of the cells impedance or condition.
After one complete display remove the pack to return to "-----" or press Charge button to **CHARGE.**
NO data is displayed if the Amp hours values are zero.

Cycle Mode

Press BOTH the charge and discharge buttons together. The display will show **C=1.** Use the CHARGE/+1 button to increase the number of cycles required. When ready to start press the GISCHARGE/GO button. CCD will automatically **discharge** then **charge** the cells the selected number of times. Between operations **C= X** (where X is the current cycle) will be displayed until the cells are removed. If the cells are removed during the cycle **FAIL** will flash 3 times, then return to "-----".

Fuse Replacement

Possible causes of fuse failure are:-

1) F1 or F2 will fail if the 12 volt supply is reverse connected.
2) F1 will fail if the cells are connected and the power leads are touched together.
3) F2 will fail the cells are reverse connected.

To replace a fuse:-

1) Disconnect the CCD from the 12 volt supply and cells.
2) Carefully remove the four screws on the underside of the CCD.
3) Slide off the black metal cover.
4) Replace the fuse with Schumacher part number G647D.
5) F1 is closer to the ammeter. F2 is closer to the white ceramic resistors.
6) Replace the cover and screws. DO NOT over tighten the screws.
7) Connect the 12 volt supply.

Continuous fuse failure will need the CCD to be returned for repair.

Hint and Tips

1) DO NOT connect the CCD to the mains supply.
2) DO NOT use CCD on a heat sensitive surface.
3) DO NOT get CCD wet. Clean with a soft damp cloth.

4) DO keep your cells insulated and connectors in perfect condition as this will reduce the risk of accidents and improve performance.

During the **tESt** period CCD tests:-

a) If a pack has been connected without the 12 volt supply. Test failure displays **No In.** Disconnect the cells and connect the 12 volt supply.
b) The charge FET and fuse. Test failure displays **Er:F1.** Replace F1 (see fuse replacement) If the test still fails, return for repair.
c) The discharge FET and fuse. Test failure displays **Er:F1**. Replace F2 (see fuse replacement) If the test still fails, return for repair.
d) The heatsink temperature sensor, failure displays **Er:tP**. Return for repair.

If all these tests are passed the display will show "-----"

Charge

With a pack connected press the CHARGE button. If the power in voltage is below 11.5 Volts the display will show **Lo.In.** To continue press CHARGE, to abort press DISCHARGE. While charging the display will flash **Ch** (or **Ch.** If reflex method is selected at switch-on). After one second the cells will be checked for a voltage increase. If not detected the charge will stop and **Fail** will flash three times and the display return to "-----". Adjust the current as required. Every second the amp meter will be seen to dip, this allows the digital sampling process to take place off charge to reduce the chances of false peaks. After the 90 second lock out period to prevent false cut-off the cells are automatically cut-off using the delta peak detection system (10mV for 10 seconds). After the charge is over the data is continuously displayed as shown in Charge Data Display.

If the cells are removed before the end of a charge **FAIL** will flash 3 times, then return to "-----". If the heatsink temperature exceeds 70 degrees C the display will flash **HOT** but the charge will cintinue.

If the charge button is pressed during the charge the display will show the charge AmpHrs.
e.g. **Ah 0.6.**

Note: The AmpHrs will NOT be displayed:-

1) During the first 90 seconds of a charge.
2) In cycle mode.
3) If the calculated value is below 0.1 AmpHrs.

Charge Data Display

After the automatic fast charge cut-off the following data will be continuously displayed:-

Ct=, 25, Ah=, 1.97, PU=, 10.8

Where:-
Ct= the charge time in minutes.
Ah= the charge amp hours.
PU= the peak charge voltage.

After on complete display cycle remove the cells and return to "----" or
Press the CHARGE button to boost charge (**bC or bC.** Displayed) or
Press DISCHARGE button to discharge.

Discharge Mode

With a pack of cells connected press the DISCHARGE button. The display will flash **dc** and the pack will be discharged using 6 Amp pulses. This will continue until the on-load pack voltage drops below 0.5 Volts. The displayed data is calculated at the maximum useful voltage of 4.8 Volts. If during the discharge period the heatsink temperature exceeds 70 degC the discharge rate is reduced until the temperature drops below 70 degC again. If the cells are removed before the end of a discharge **FAIL** will flash 3 times, then return to "----". After the discharge the data is displayed continuously. The off-load pack voltage will recover naturally to its normal voltage.

Specifications

1 to 7 cells (1.2 to 8.4v)
Charge current:- 1 to 8 Amps pulsed (controlled to safe heatsink temperature)
Accuracy:- Current/Amps hours + 5 %, Voltage + 1%.
Repeatability:- Better than 1%
Input voltage:- 15 maximum. 12 minimum.
(Use only 12 volt auto battery or regulated power supply)

Guarantee

1) Always test your CCD on a FULLY CHARGED 12 Volt automobile type battery before returning for service. This will eliminate any possible power supply problems.
2) Please return you CCD direct to Schumacher Ltd (UK) or Schumacher Inc (USA) for repair. Contact your local distributor outside these countries. You should allow 21 days for repair. Please give as much information as possible about the suspected cause of failure and the fault symptoms as this can lead to a quicker and cheaper repair.
3) NO REPAIR WORK WILL BE STARTED unless CCD is accompanied by a cheque or postal order to cover the normal service cost of £15. A full refund will only be given when a repair is carried out under guarantee due to faulty components or workmanship within 90 days of purchase. Visa, Access or Mastercard number, name, card address and expiry date is also ideal. Please include a contact telephone number if possible. PROOF OF PURCHASE IS REQUIRED FOR WARRENTY CLAIMS.

The CCD 2000 will charge Nimh type cells however no design changes have been made since the introduction of these cells. Caution must be taken when using this charger and Nimh that the cells do not get too hot.

No liability can be accepted for any consequental damage howsoever caused.