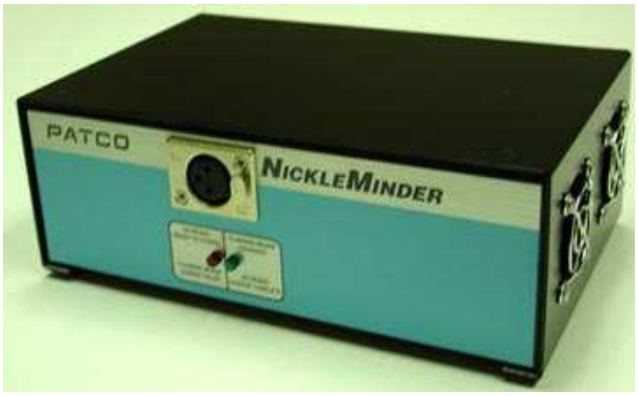
NICKLEMINDER 8200

The ***NICKLEMINDER 8200 Series*** is a battery charger with two key characteristics. First, the ***NICKLEMINDER*** is designed to support Nickel Cadmium and Nickel Metal Hydride batteries. Full charge is determined by the most sophisticated microchip designed expressly for that purpose. Full charge may be established based on zero slope voltage detect, or rate of temperature increase. Secondly, the ***NICKLEMINDER*** is a programmed charger, with custom cell count and capacity tailored for the individual battery pack at the time of purchase at no extra charge.



CHARGE ALGORITHYM:

1. **SOFT START CHARGE**: the current increases gradually over the first two minutes from approximately one fifth of the bulk charge current up to the user selected bulk charge rate.
2. **BULK CHARGE**: current is supplied to the battery at the rate programmed into the charger for the unique battery pack.
3. **TOPPING CHARGE:** current is supplied for two hours at a C/10 rate to complete the charge cycle.
4. **MAINTENANCE CHARGE**: current is supplied at a C/40 rate until the battery is disconnected from the charger.

The following graph illustrates the ideal charge curve of a NiCad battery. The 8200 chargers use the four phase charging cycle outlined above. The charge cycle is broken down into approximately one second intervals. Within an interval, the charger will first supply the current it is programmed for as a bulk charge current. At the end of approximately one second, the current is shut off for 8 milliseconds. Then the current is reversed, discharging the battery at two and a half times the bulk charge rate for 5 milliseconds. The charger is quiet for 16 milliseconds, during which time a voltage measurement is made, and the results stored. The Model 8200 calculates the first derivative of the curve produced by these voltage measurements. When the first derivative goes to zero, the charger terminates the bulk charge phase and moves to the "Topping" phase. **Figure 1**, shows the Model 8200 voltage curve as it brings a cell battery from full discharge to full charge. Because the Model 8200 is programmable over such a wide range of cell count and capacity, the data is given in "Volts per Cell". To obtain the battery voltage, multiply the number of cells times the voltage given in **Figure 1**.

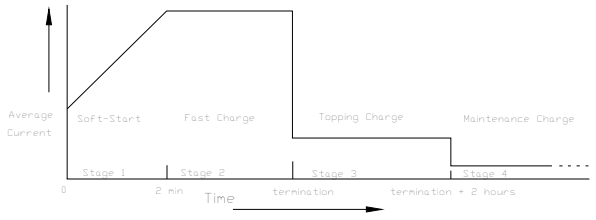
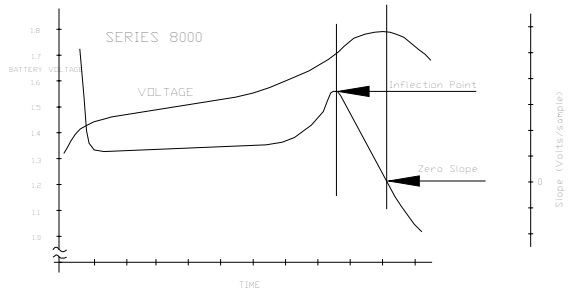


Figure 1

Following the Soft Start phase, the Model 8200 supplies to the battery a constant current of C/4 to 4C amperes, depending on the bulk charge programming. As the battery reaches its capacity, the Model 8200 can terminate charging based on either voltage slope parameters or temperature slope parameters. Absent such an indication, an override timer will terminate charge

The management of the current flowing to the battery during this process is critical if the process of energy storage is to be optimized. Nickel cells, Cadmium or Metal Hydride are charged at a constant current until the charge storage process is complete. The sophisticated operation of detecting this completion requires a computer. By selecting the proper program for the battery type being charged, the Model 8040 can determine with extraordinary accuracy full charge, and terminate the process. As a safety factor, if the "Zero slope" criteria is missed, a timer overrides all other measurements and terminates the charge process, preventing the damaging overcharge that can occur in less sophisticated chargers. Temperature is also a criteria that can terminate charge, either as a selected way of determining charge complete, or as a safety factor in voltage slope termination. To use this feature, a thermistor must be included in the battery pack.



Charge Termination Criteria

The ***NICKLEMINDER Model 8200*** is ideal for both charging and conditioning batteries of 20 amp hour capacity and less, with a power envelope of 80 watts delivered to the battery, and a maximum current out of 5 amps.. The instrument can be programmed for charge currents from 20 milliamps to 5 amps, from 2.4 volts nominal to 24 volts nominal, with an output power envelope limitation of80 watts.

Specifications

Voltage Range	2.4 - 24.0 Volts(nominal)
Current Range	To 5 amps
Packs charged	1
Temperature Range	-30 to 40 Degrees C
Maximum Time	6 Hours
AC Voltage In	95-265 VAC
Frequency In	50/60 Hz
Power In	80 Watts

Ordering Information

The Model 8200 can be configured when ordering using the following information:

AAAA-BB-CC-DD

AAAA is model number, BB is the cell count for the battery, CC is the battery's capacity in amp hours, expressed as two significant figures and DD is the charge time in quarter hour increments. For a five cell, 4.4 Ah NiCAD, and a C/2 charge rate, the 8200's Model Number would be:

8200-05-44-08.

The maximum power delivered to the battery would be a nominal 16.5 watts, and the maximum current would be 2.2 amps. These parameters fall within the Series 8000 limitations given in the table above, so the part number is valid.

Size:
8" Long, 3" High, 5.35" Deep

Construction:
Aluminum body,
ABS end caps

Finish:
Electrolytic Hardcoat

Weight:
2.5 lbs., 1.2 Kg

Operating Temperature:
-30 to +40 Degrees C

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