

OPERATION MANUAL

for the

Six Station 9 Volt NiMh and NiCd Battery Fast Charger-Tester



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DESCRIPTION

The Dan-Mar Company *six station Fast Charger and Tester* is for popular Nickel-Metal Hydride (NiMh) and Nickel-Cadmium (NiCd) rechargeable "9 Volt" batteries. In addition to charging batteries, the unit also provides a [Capacity Test](#) based on the milliamp-hour (mAh) rating of the battery.

Fast charge time is typically less than 2.5 hours. The Charger-Tester switches to a trickle charge after fast charge, then turns off after a total charge time of 10 hours. Batteries cannot be overcharged.

The capacity test (discharge) requires 2.5 hours, and is timed automatically. During this time, each battery is placed under load and its voltage is monitored. If a battery voltage falls below a preset level, the Discharge LED changes from Steady On to Flashing. At the end of the test, any Discharge LED that is flashing remains flashing until the capacity test is reset.

These "9 Volt" rechargeable batteries are currently available in six cell (7.2 Volt) and 7 cell (8.4 Volt) configurations, and in 120 mAh, 150mAh and 200 mAh capacities. The Charger-Tester is customized for the *specific batteries* to be used.

IMPORTANT: To prevent overcharge and for accurate capacity tests, only use the specific batteries for which the Charger-Tester was customized.

Each battery station has three LED's to indicate the status - [Fast Charge](#), [Charge](#) (trickle) and [Discharge](#). In addition, one LED indicates if the charger is [Ready](#) or [Finished](#).

The Battery Charger-Tester is *microprocessor* controlled. The microprocessor provides the ability to customize many functions including setting the discharge cutoff voltage, the total charge time and the discharge time to meet different battery specifications and customer requirements.

FEATURES

- Six NiMh or NiCd batteries can be fast-charged or tested at one time.
- Constant charging current.
- Fast-charge is terminated by detecting battery zero voltage slope ($dv/dt = 0$) that occurs when battery is near full charge.
- Batteries cannot be overcharged.
- Battery chemistry may be mixed. (However the number of cells in each battery, i.e. 6 or 7, must match the charger specification.)
- Microprocessor controlled.
- Optional universal switching power supply accepts 100 - 240 volt 50 - 60 Hertz input voltage.

OPERATING INSTRUCTIONS

CHARGING BATTERIES

1. Connect the Charger to AC power. The Ready (blue) led will come on steady.
2. Place the batteries to be charged on the charger. OBSERVE POLARITY. Do not reverse connections. One to six batteries can be charged simultaneously.
3. Press the CHARGE-RESET switch to start charging the batteries. The Charge (green) and Fast Charge (red) led's will come on.
4. Pressing the CHARGE-RESET switch again terminates the charge cycle and resets the charge timer. When reset, the Ready (blue) led will come on steady.
5. Fast Charge may take 3 hours or more. The charger switches to Trickle Charge after Fast Charge. The Fast Charge (red) led turns off and the Charge (green) led remains on when the charger switches to trickle charge.
6. The charge cycle ends and the Finished (blue) led flashes after 10 hours of total charge time. The batteries cannot be overcharged.
7. Remove the batteries from the charger and disconnect the charger from AC power.
 - a. The batteries will slowly discharge if left on the charger and the charger is disconnected from AC power.
 - b. The batteries will not discharge if left on the charger and the charger is connected to AC power; Ready (blue) led is on.

DISCHARGING BATTERIES (Capacity Test)

1. Connect the charger to AC power. The Ready (blue) led will come on steady.
2. Place the batteries to be tested on the charger. OBSERVE POLARITY. Do not reverse connections. One to six batteries can be tested simultaneously.
3. Press the DISCHARGE-RESET switch to start discharging the batteries. The Discharge (yellow) led will come on steady.
4. Pressing the DISCHARGE-RESET switch again terminates the discharge cycle and resets the discharge timer. When reset, the Ready (blue) led will come on steady.
5. The Discharge cycle ends after 2.5 hours and the Finished led flashes indicating the battery capacity test has ended.
6. A flashing Discharge (yellow) led indicates that the battery has lost greater than approximately 15% capacity. Replacing the battery should be considered.
7. Remove the batteries from the charger and disconnect the charger from AC power.

Note: An interruption of AC power during a charge or discharge cycle causes the CHARGER-TESTER to reset. After a power interruption, the Finished (blue) led will come on steady and no other led's will be on.

A WORD ABOUT THE USE OF RECHARGEABLE 9 VOLT BATTERIES

Rechargeable NiMh or NiCd 9 volt batteries have only about 1/4 the capacity of alkaline 9 volt batteries (150 mah vs 620 mah). Thus, their operating time before recharging is required is reduced accordingly.

Rechargeable batteries self-discharge over several weeks and months, thus their shelf life in the fully charged state is relatively short. As a comparison, alkaline batteries have a 2 – 3 year shelf life, retaining greater than 95% capacity after 3 years when stored at room temperature.

The voltage of a rechargeable battery during discharge is relatively steady compared to an alkaline battery. However, the voltage of a rechargeable battery drops rapidly as the battery approaches full discharge, and the device may stop working without much warning.

The best application for a rechargeable 9V battery is for a device that is always used a known length of time (within the capacity of the battery, of course), then recharged before the next use. For example, wireless microphones in theatre productions or churches. Also, since the capacity of the battery is reduced with use and age, it is necessary to periodically test the batteries to ensure that the device will continue to operate for the necessary time. **This is the major feature of the CHARGER-TESTER.** The capacity of each battery is tested using the Capacity test feature of the charger every 2 or 3 months, or sooner, if there is an indication that one or more batteries may have a problem. Thus, a battery is not likely to fail during "normal" use. Certainly a rigorous maintenance program is required when using rechargeable 9V batteries.

A substantial cost savings is realized for those applications that use many batteries during a year. For example, churches and theaters that use multiple wireless microphones used every Sunday or weekend realize a payback in less than a year, and sometimes in 6 months or less. For these applications, the system is ideal.

SERVICE AND REPAIR INFORMATION

There are no user serviceable components inside the CHARGER-TESTER. Dan-Mar Company, Inc. manufactured equipment must be repaired only at the factory to ensure quality workmanship and to update the equipment to current production standards. Exact replacement parts are used. Each piece of equipment repaired is subjected to the same quality control tests as new production. Such procedures, exact replacement parts and the specialized test equipment required is not available in the field or at other generalized repair shops.

If repair is required, please return the item with shipping charges prepaid to the factory at the address listed on page 1. Please include a note or letter describing the problem and include the name and telephone number of the person(s) knowledgeable of the problem.

LIMITED WARRANTY

Each unit is tested extensively before shipment and carries a 1 year LIMITED WARRANTY. If the unit fails to test or perform due to a defect in material or workmanship and is returned with shipment prepaid to Dan-Mar Company, Inc., 10319 Wikel Road, Huron, Ohio 44839, it will be repaired or replaced at our option. This LIMITED WARRANTY is void if the equipment has been dismantled, altered, or otherwise abused in any way.

The above LIMITED WARRANTY is exclusive and in lieu of all warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose. Under no circumstances shall Seller or Manufacturer be liable for damages of any description occasioned by or resulting from operation or use of this equipment.

We cannot anticipate all conditions under which this information and our products, or our products in combination with the products of other manufacturers, may be used and therefore accept no responsibility for the results obtained, the suitability or the safety of our products when used alone or in combination with other products. The user must make his own tests to determine the suitability and safety of each product and product combination for his own purpose. We sell the product without warranty and the buyers and users assume all responsibility and liability for all losses (including anticipated profits), consequential damages, or incidental damages arising from the use of our products alone or in combination with other products.