# Charging Methods for Professional Batteries

Questions often arise regarding the various methods of charging professional level batteries. One thing to consider when attempting to "marry" a battery with a particular charger is the type of charger being used, versus the battery chemistry. Below is a synopsis of the various charging methods for each battery chemistry. If you have a charger that is advertised as "Multi Format" it implies that it can sense the type of battery (battery chemistry) you put on the charger, and will charge it with the proper method.

| Chemistry | Charging Method | |
|---|---|---|
| **Lithium Ion** | **CC/CV** | (Constant Current/Constant Voltage) |
| **NiMH** | **ΔT/ΔT** | (Delta Temperature/Delta Time) |
| **NiCd** | **–ΔV** | (Negative Delta Voltage) |

**Constant Current / Constant Voltage** (CC/CV) is the charging method used for Lithium Ion batteries. The charging starts with constant current and switches to constant voltage towards the end. Large amount of energy can be charged in the constant current stage, therefore 70-80% of capacity can be charged in 1/3 of its total charge time. The remaining 20-30% will be charged slowly. It is very important to remember that batteries and charger must have proper charging and protection circuitry for proper charge cut-off.

**Delta Temperature/Delta Time** (ΔT/ΔT) is charging method used for NiMH batteries. The charge cut-off is determined by the change in temperature over the change in time.

**Negative Delta Voltage** (–ΔV) is most popular charge method for NiCd batteries. The fast charge cuts off at the voltage peak. As an extra precautionary measure, IDX charger includes temperature sensor to monitor charge cut-off.

**** REMINDER **** For optimal battery performance, batteries must be used on chargers from the same manufacturer. Each manufacturer has specific communication protocol between the battery and charger for best compatibility.

IDX products should be used only with IDX approved equipment. The use of unauthorized equipment may result in the limitation or voidance of IDX product warranties. IDX does not authorize, condone, recommend, or otherwise assume any liability or responsibility resulting from the use of any battery, charger or accessory not made or sold by IDX. Please use only IDX original equipment.

**Please note that IDX measures the capacity of lithium ion as minimum capacity.*

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