NICKEL-METAL HYDRIDE BATTERY INSTRUCTIONS

IMPORTANT!! Failure to read and obey all instructions contained herein can result in battery failure and possibly a cell RUPTURE and/or FIRE which could result in quick, severe, permanent damage to the battery and its surroundings!! Care must be observed when handling nickel-metal hydride (NiMH) batteries. Misuse, overcharging, and other conditions could cause a NiMH battery to become hot, vent hot gases, and possibly rupture violently and/or catch fire. This product is intended for use with radio controlled models only. As the full scope of possible R/C hobby applications is too large to cover every possible use in these instructions, the user assumes the responsibility to make smart and safe decisions about the use of this product.

- **NEVER LEAVE BATTERIES UNATTENDED WHILE BEING CHARGED!**
- **NEVER** use an incompatible charger to charge a NiMH battery.
- **NEVER** over-charge a NiMH cell.
- **NEVER** charge a NiMH at a rate exceeding its maximum charge current rating.
- **NEVER** discharge a NiMH at a rate exceeding its maximum discharge current rating.
- **NEVER** allow the battery's temperature to exceed 140°F (60°C).
- **NEVER** store batteries near an open flame or heater.
- **NEVER** disassemble or modify a NiMH battery.
- **NEVER** put a NiMH battery in the pocket of any clothing.
- **NEVER** allow NiMH cells to become damaged physically.
- **NEVER** short circuit individual NiMH cells or assembled packs.
- **ALWAYS** charge the battery in a fireproof setting with good ventilation.
- **ALWAYS** keep out of reach of children.
- **ALWAYS** check batteries for signs of physical damage before use.

GLOSSARY OF TERMS

CELL: a single battery unit within an assembled pack.

PACK: multiple cells connected together electronically form a "pack".

VOLTAGE: a battery's maximum electric potential, with individual NiMH cells nominally rated at 1.20V.

CAPACITY: amount of energy a battery can store. Typically listed as "mAh" (milliamp-hours), the higher the rated capacity the longer the run time.

C-RATE: a multiplier for calculating a battery's maximum rated current load limit. Multiplying a battery's c-rating by its capacity rating in *Ah* (mAh/1000) results in the battery's maximum theoretical current rate.

GENERAL CARE AND HANDLING OF NIMH BATTERIES

- **NEVER LEAVE BATTERIES UNATTENDED WHILE BEING CHARGED OR DISCHARGED!**
- **NEVER** allow a NiMH battery's temperature to exceed 110°F (43°C) while being charged or 140°F (60°C) while being discharged. Keep NiMH batteries away from open flames and heaters. Wear protective gloves when moving a heated battery.
- **NEVER** use a NiMH battery which shows signs of physical damage, such as a deformation of the cylindrical structure (swelling or dent) or puncture.
- **ALWAYS** keep combustible/flammable items away from NiMH batteries while being charged or discharged, such as paper products, flammable liquids and gases, cluttered workbenches. Remove the NiMH battery from the R/C model for charging. Do not charge on counter-tops, tables, carpets, furniture, inside cabinets, over or under flammable items.
- **ALWAYS** provide adequate ventilation around NiMH batteries while being charged or discharged.
- **ALWAYS** remove metallic objects such as wristwatches, bracelets, or rings from the hands and wrists when handling NiMH battery packs. Accidentally touching battery terminals to any such objects could create a short-circuit condition and possibly cause severe personal injury.
- For proper long-term storage of a NiMH battery, charge or discharge it as needed so that approximately 50% full charge remains. Store in a cool (40-80°F), dry place away from sunlight and inside a fireproof container.
- When removing from long term storage it may be necessary to charge and discharge the battery repeatedly a few times to regain normal operation. If batteries are stored for a period longer than one (1) year it's recommended to charge the battery at least once per year to prevent leakage or other deterioration.
- ALWAYS make sure all NiMH connectors are covered to prevent an accidental short. Small sections of fuel tubing make good insulators.

IN CASE OF FIRE

NiMH batteries contain flammable materials which could be ejected from a cell if it ruptures during an overcharge condition, which is often preceded by the cells becoming hot (>150°C, 302°F) while building internal pressure. Have a fire extinguisher nearby in the event that a cell overheats and bursts. Common CO_2 extinguisher types such as Halon or ABC are acceptable.

CHARGING NIMH BATTERIES

WARNING!! Failure to follow any of these warnings could result in internal damage and/or catastrophic failure of the battery and its surroundings in the form of cell RUPTURE and/or FIRE.

- **NEVER** use an incompatible charger to charge NiMH batteries. Read the charger's specifications and features list to ensure its compatibility. If unsure, contact the charger's manufacturer for confirmation. NEVER use a charger designed for lithium batteries to charge a NiMH battery.
- **NEVER** charge a NiMH cell to more than 1.4-1.6V. Maximum total pack voltage should never exceed 1.4 to 1.6V x the total number of cells in the pack. Always set the charger's settings to match the ratings of the battery. Manually stop the charge process immediately if the charger fails to recognize full charge.
- **NEVER** charge a NiMH cell at a current which exceeds the maximum charge rating shown on the battery's label.
- **NEVER** apply a trickle charge at a rate which exceeds the battery's C/10 value. This can be calculated by multiplying battery's rated capacity by 0.1. Example: a battery rated for 3000mAh can be trickle charged at 300mA (3000mAh x 0.1 = 300mA).
- **NEVER** allow a NiMH to continue charging if the battery begins to get hot, vent gases, or emit smoke. Stop the charge process immediately and leave the battery sit idle in its fireproof location for at least 1 hour. Batteries exhibiting these behaviors are permanently damaged and should never be used again. See the Disposal of NiMH Batteries section for details.
- **ALWAYS** charge a NiMH in a fireproof location away from combustible/flammable materials.

1. RE-READ ALL WARNING NOTICES ABOVE BEFORE PROCEEDING.

2. Place the battery in the fireproof location, and select the appropriate NiMH compatible charger with settings that match that of the battery to be charged.

3. Where applicable, set the charger's output voltage to EXACTLY MATCH the voltage rating shown on the battery's label.

4. Set the charger's current level (amps or milli-amps) to not exceed the maximum rated charge current shown on the battery's label.

# Cells	Nominal Voltage
1	1.2V
4	4.8V
5	6.0V
6	7.2V
7	8.4V
8	9.6V

5. Some chargers may require the battery's rated capacity be set instead of, or in addition to, setting the charge current level. Set the charger's capacity level to match that shown on the battery's label. Make sure the charger doesn't automatically set a current level which exceeds the maximum charge rating of the battery. See the charger's instructions for details.

6. Some chargers include a battery temperature monitoring function which can automatically stop the charge process if a battery exceeds a specified temperature. It's recommended to use a temperature monitoring system and set the charger's maximum temperature to 110°F (43°C). See the charger's instructions for details.

7. ALWAYS make sure the charge adapter cable is connected to the charger BEFORE connecting the battery to the cable. Only after this is confirmed, connect the battery's main connector to the charge adapter.

8. Start the charge process. **NEVER LEAVE THE ROOM WHERE THE BATTERY AND CHARGER ARE LOCATED UNTIL THE CHARGE PROCESS HAS COMPLETED!**

DISCHARGING NIMH BATTERIES

WARNING!! Failure to follow any of these warnings could result in internal damage and/or catastrophic failure of the battery and its surroundings in the form of RUPTURE and/or FIRE.

- It's best to not discharge a NiMH cell to less than 0.9V. Minimum total pack voltage should not be less than the total number of cells in the pack multiplied by 0.9V. Check the instructions included with battery dischargers and electronic speed controls to make sure they stop the discharge process at a voltage no lower than described here.
- **NEVER** allow a NiMH to continue discharging if it becomes hot, swells, or emits smoke. Stop the discharge process immediately and leave the battery sit idle in its fireproof location for at least 1 hour. Batteries which swell or emit smoke are no longer safe for use and should be disposed of immediately.

1. When powering an ESC:

a. Do NOT use an ESC unless it's compatible for use with NiMH batteries.

b. Carefully follow the ESC's instructions to set the proper low voltage cutoff point for the battery. It's recommended to not allow the battery to discharge below 0.9V per cell. For ESCs which do not have an adjustable low voltage cutoff level, make sure the low voltage cutoff value is not below 0.9V.

c. When finished operating the model always disconnect the battery/remove power from the model BEFORE turning off power to the radio controlled transmitter. Failure to do so could cause the power system inside the model to run out of control, possibly resulting in damage to the surroundings or personal injury. Always disconnect NiMH batteries from ESCs when not in use to prevent accidental over-discharge.

2. When using a battery discharger:

a. Choose an isolated, fireproof area to discharge the battery as explained on above.

b. For optimum lifespan of the battery, set the discharge cutoff voltage to 0.9V per cell. DO NOT discharge a NiMH below 0.9V.

c. Set the discharger's output current to an appropriate value for the battery.

# Cells	Nominal Voltage	* Minimum Discharge Voltage
1	1.2V	0.9V
4	4.8V	3.6V
5	6.0V	4.5V
6	7.2V	5.4V
7	8.4V	6.3V
8	9.6V	7.2V

* Based on 0.9V per cell

3. ALWAYS make sure the discharger adapter cable is connected to the discharger BEFORE connecting the battery to the cable. Only after this is confirmed, connect the battery's main connector to the adapter.

4. Start the discharge process. **NEVER LEAVE THE ROOM WHERE THE BATTERY AND DISCHARGER ARE LOCATED UNTIL THE DISCHARGE PROCESS HAS COMPLETED!**

BATTERIES INVOLVED IN A CRASH

Closely inspect a NiMH battery which has been involved in a crash to ensure no physical damage has occurred. Make sure the pack is free from cracks, splits, punctures, swelling, deformation, discoloration, or damage to the wiring and connectors. Otherwise, a damaged battery can later fail, resulting in a total loss of power in the battery or even a RUPTURE or FIRE. Remove the NiMH battery from the crashed model and place it in a fireproof location for up to 24 hours for observation.

PERSONAL SAFETY & FIRST AID

PHYSICAL CONTACT: If you come in physical contact with any parts of a burning NiMH battery or where internal electrolyte has leaked out of a cell, remove the contaminated clothing and shoes. Immediately wash the affected area of skin with soap and water and rinse for 15 minutes. Wash clothing and shoes before reuse. If irritation occurs, seek professional medical attention. Wait for burned components to cool. Use gloves to safely remove the burned components and refer to the Disposal of NiMH Batteries section for further details.

SMOKE OR GAS VAPORS IN THE EYES: Flush the eyes immediately with plenty of water for 15 minutes while holding the eyelids open. Get professional medical attention if irritation persists.

INHALATION: If smoke or gas vapors are inhaled, move to an area clear of smoke and seek professional medical attention if breathing becomes labored/difficult. If burning battery components are inhaled, do not induce vomiting. Seek professional medical attention immediately.

Within the U.S. call the national toll-free **Poison Help hotline at 1-800-222-1222** or see **www.illinoispoisoncenter.org**.

DISPOSAL OF NIMH BATTERIES

To dispose of NiMH batteries which have reached the end of their life cycle or have been damaged, contact your local waste disposal management authority for details. Make sure cells are fully discharged prior to disposal. Do not incinerate, puncture, or open NiMH cells. Observe all national, state, and local regulations for disposal of NiMH batteries. Never throw NiMH cells in the public waste system, or into water source or sewage systems.

CONSUMER NOTICE

By purchasing this product the user agrees to have read and understood all information included, and to bear full responsibility for inspecting and determining any signs of damage or abnormalities to this product at all times, to discontinue use immediately if an abnormality exists in the product's form or function, so to avoid causing any injury, loss, or damage directly or indirectly resulting from the use of this product. If these terms are unacceptable, the user should return the item in its original unused condition to the place of purchase. By accepting these terms the user agrees not to hold Onyx, its distributors (owners and employees) and/or retailers responsible for failures and damages resulting from failures.

2-YEAR LIMITED WARRANTY

ONYX brand NiMH batteries are warranted to be free from defects in materials and workmanship for a period of two (2) years from the date of purchase. During the first twelve months, ONYX will, at our discretion, repair or replace without service charge any product deemed inoperable due to those causes.

To obtain the benefit of this warranty, read this statement in its entirety. **NEVER ATTEMPT TO SHIP BATTERIES BACK FOR SERVICE WITHOUT CONTACTING ONYX FIRST FOR INSTRUCTIONS.** Refer to ***www.onyx-rc.com/support*** to enter your information and be contacted by a product support specialist to discuss a claim.

Proof of purchase in the form of an invoice or receipt specifically listing the item for which warranty coverage is claimed will be required. Proof of purchase must originate from an authorized sales affiliate of ONYX.

All warranty return shipments and claims must include a full description of the reason for requested warranty coverage, and include a daytime telephone number or e-mail address by which consumers can be contacted. This warranty gives consumers specific rights. Other consumer rights may exist which vary from state to state.

ONYX reserves the right to refuse warranty coverage if it's deemed that damage occurred as a result of abuse, misuse (including but not limited to over-charge and over-discharge of the cells), alteration or accident. Do not attempt to disassemble or repair any ONYX brand battery as otherwise the warranty will voided. For any damage within the first twelve months of the warranty period stemming from such causes ONYX will, at its option, repair or replace the battery for a service charge not greater than 50% of its currently listed retail price.

For warranty coverage outside of North America, do not return products to ONYX. Contact the place of purchase for details

EXTENDED WARRANTY

After the first full year of warranty coverage ONYX will provide extended warranty coverage for another 12 months covering only defects in materials and workmanship. This extended coverage is limited and does not cover problems caused by abuse, misuse, and improper maintenance, failure to follow instructions, ordinary wear, or use past the battery's maximum rated number of cycles.

During the extended coverage period, ONYX will, at our discretion, repair or replace the product at a price equal to 30% off the currently listed price shown on ***www.onyx-rc.com***. Credits will not be provided as a part of this warranty coverage. Proof of purchase as explained above is required for this extended coverage.

Replacement batteries provided through this warranty policy shall be covered for the remainder of the warranty period of the original product, established by the purchase date of the original product. If the original item is discontinued, ONYX reserves the right to replace the product with the closest equivalent product available. This warranty is non-transferrable.

ONYX reserves the right to amend this warranty policy at any time without notice. An amended warranty policy will supersede all previous warranties, whether expressed or implied. ONYX does not recognize nor honor any warranties, expressed or implied, not stated in this ONYX warranty policy. This warranty applies to ONYX brand NiMH batteries shown on the ***www.onyx-rc.com*** web domain.

Hobby Services
3002 N. Apollo Drive, Suite 1
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www.onyx-rc.com/support

Duratrax Onyx 110 AC/DC Peak Charger (DTXP4191)
It's perfect for entry-level modelers and small budgets. Compact and low-cost, the Onyx 110 makes it easy to get a full, deep charge on NiCd and NiMH packs. Set the charge rate, attach the pack and it starts charging automatically — and switches to a trickle charge rate when peak charge is reached. Works with packs ranging from tiny 600mAh "AAA" to 6000mAh sub-C size cells — and anywhere there's AC or DC power.

- Great for a pit table, but includes a built-in switching AC power supply for use on your workbench at home.
- Small enough to slip in a pit bag or shirt pocket — and weighs just under a half-pound!
- Charges 6- and 7-cell power packs as well as 4-, 5-cell and 8-cell radio packs.
- Starts charging at hookup, peaks packs automatically and switches to trickle charge rates to keep them topped off.
- Simple to use, built to last — and protected by a full 5-year warranty.

Onyx™ 225 AC/DC Advanced Balancing Charger (DTXP4225)
You can spend more on other chargers, but you can't find a better value in peak and balanced charging than the Onyx 225. It arrives with 10 charging routines already in memory and lets you customize them to your specific needs. The display is a 2x16 reversed, backlit LCD, for easy reference to every operation in any lighting condition. And comes with today's most popular connectors, including a JST EH balancing connector and the high-efficiency Star Plug.

- Charges up to 6 LiPo, LiIon or LiFe cells or up to 15 NiCd/NiMH cells.
- Powerful 60W AC/DC power supply.
- Large, reversed and backlit 2x16 LCD screen.
- Fully programmable with 10-model memory.

Duratrax Charge Leads
Make the connection between your batteries and charger with affordable Duratrax charge leads. These leads measure 4.7" (120mm) long and feature 14AWG wire.

DTXC2221
Connector #1: Banana plugs
Connector #2: Star male plug

DTXC2220
Connector #1: Banana plugs
Connector #2: Standard Tamiya plug

NIMH